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The Library in Corporate Intelligence Activities

Thomas D. Walker
Issue Editor

University of Illinois
Graduate School of Library
and Information Science

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TRENDS

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Introduction

THOMAS D. WALKER

COMPANIES OF EVERY SIZE have established formal or informal methods of learning about their industries and competitors. While many organizations do rely on their own libraries or information centers for some of this kind of information, there continues to be a trend toward the establishment of "intelligence departments," sometimes called "BI" (business intelligence), "CI" (competitive, competitor, or corporate intelligence), or "ICN" (internal collection network) departments. The literature on this topic is commonly found in business and management journals rather than library journals and frequently addresses topics already very familiar to business librarians—i.e., finding information on products, industries, companies, and the business environment. Not all kinds of information gathering are considered to be appropriate for corporate libraries. Extra-library methods can involve field work, informal or formal, during which information is acquired from other than printed or electronic sources—e.g., sales visits, trade shows, consultants, advertising agencies, commercial credit agencies, and competitor intelligence firms. Stressed by the leading authors in the field is that these legal activities must be clearly distinguished from the illegal and unethical techniques of corporate spying or industrial espionage.

DEFINING COMPETITIVE INTELLIGENCE AND RELATED TERMS

Terms such as competitive intelligence and strategic intelligence are often used interchangeably, yet some have acquired specialized

Thomas D. Walker, School of Library and Information Science, University of Wisconsin, P.O. Box 413, Milwaukee, WI 53201
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meanings. A solid discussion of definitions is provided by Miller in his article in this issue of *Library Trends* about the education of intelligence professionals. The location and function of such activities within organizations are the two most important factors that determine the labels. A handy definition of "business intelligence" may be found as a scope note in the *Library of Congress Subject Headings (LCSH)* (1993): "Here are entered works on the systematic accumulation of information regarding business competitors and their products, including trade secrets" (vol. 1, p. 666). Another definition from a respected text in the field (Gilad & Gilad, 1988) reads: "BI is the activity of monitoring the environment external to the firm for information that is relevant for the decision-making process in the company" (p. viii). These authors define BI broadly to include monitoring activities of many kinds (Gilad & Gilad, 1988, p. 6):

Current competitors	Economic environment
Potential competition	Social and community environment
Growth opportunities	Demographics
Technological environment	Suppliers
Markets	Acquisition candidates
Political and regulatory environment	

Most of the current literature emphasizes that BI and related terms, such as CI, refer to *legal* information gathering, not to unethical or illegal practices. Gilad and Gilad state outright that, "[b]usiness intelligence is *not* industrial espionage. The latter is an overrated and largely ineffective—not to mention illegal—way of gaining temporary access to the golden egg, used by those who lack the skill to raise the right goose" (p. viii).

Sutton (1988) accepts that "competitor intelligence" and "competitive intelligence" are synonymous. He further distinguishes competitive intelligence from basic market-share and product-tracking information by the strategic purpose of the former (p. 4).

A clear definition is provided by Vella & McGonagle (1988): "Competitive intelligence is the use of public sources to develop information on competition, competitors, and the market environment" (p. 1). An enumeration of the phases of CI is informative:

- *Requirements Phase.* In this phase, you both recognize the need for CI and define what CI you need. This means considering what type of issue (strategic or tactical) is motivating the project, what questions are to be answered by the CI, who will be using the CI, and how the CI will be used.
- *Collection Phase.* In this phase, the data needed to develop the CI [are] systematically acquired. This involves a determination

of who should be performing the CI (a separate CI professional, the user of the CI, or both), a frank understanding of the constraints on the assignment (time, money, organizational, informational, and legal), identification of the relevant competitor(s), and identification of potential data sources.

- *Processing Phase.* In this phase, the data which [have] been collected [are] evaluated and analyzed to transform [them] into CI. This may involve comparing the information with CI from other sources, integrating it with other CI, or measuring the results of the CI research against predetermined "benchmarks."
- *Dissemination Phase.* In this phase, the CI is distributed, on time, to those who have requested it and, in some cases, to others who may profit from having it. Here the final form of the CI as well as security may be important considerations (pp. 3-4).

In their competitor analysis outline, Vella & McGonagle (1988) list perhaps the most important elements of a competitor analysis, thereby partially defining the primary focus of CI activities. Two of the several major categories proposed by the authors itemize some of these elements:

- Competitive Environment:

  Industry structure
  Number of competitors, product lines, and locations
  Market shares, sales, and profits
  Industry marketing, distribution, and pricing practices
  Expansion potentialities of competitors
  Important differences among competitors
  Barriers to entry and exit
  Potential entrants and future competitors
  Indirect competition

- Products and Services Offered:

  Product lines and services currently offered
  History of key products and services
  Depth and breadth of products and services
  Analysis of new products and services offered, including market impact and impact on competition
  Level and consistency of quality control
  Experiences with recent new products or services
  Probable new products or services to be introduced/eliminated (pp. 121-22).

Other major categories, each with its own list of elements, include the following: sales; pricing policies; sales force and customers, marketing, personnel, resources, and facilities; technology, research,

and development; financial and legal position; ownership, control, and management; overall business strategies, policies, objectives, and perception of itself; and perception by competitors and by customers (Vella & McGonagle, 1988, pp. 122-25).

As demonstrated by the mentioned categories, there are sources and types of sources that are not accessible to traditional librarians or information professionals. In a survey by the Conference Board, Inc., there were four categories of information sources perceived to be "very" or "fairly" important (Sutton, 1988):

- Sources within the company:
  Sales force; marketing research staff; analysis of competitors' products; planning staff; engineering staff; former employees of competitors; and purchasing staff.
- Contacts within the trade:
  Customers; meetings, trade shows; distributors; suppliers; trade associations; consultants; retailers; competitors' employees; and advertising agencies.
- Published information:
  Industry periodicals; companies' promotional materials; companies' annual reports; companies' 10K reports; security analysts' reports; financial periodicals; speeches by managers; general business periodicals; national newspapers; newspapers in cities where competitors have facilities; directories; and government publications.
- Other sources:
  Security analysts; tracking services; electronic databases; investment banks; court records; want ads; and commercial banks (p. 19).

Most of these activities are concerned with external environments. In their article in this issue, Auster and Choo define "environmental scanning" as "the acquisition and use of information about events and trends in an organization's external environment, the knowledge of which would assist management in planning the organization's future courses of action" and indicate that it includes both general exposure to external information and focused issue-oriented searching, all to the end of providing management with strategic decision-making information. The authors trace the term back to the late 1960s. H. Frances Greene (1988) suggests that "[i]nformation gathered on the environment in which a company operates has come to be known as competitive intelligence" (p. 285). Referring similarly to the general business environment, Lancaster and Loescher (in their article in this issue of *Library Trends*), suggest that "issues management" is an activity or group of activities that can be performed by an issues management group within an organization for the purpose

of identifying technological or social issues likely to have positive or negative impacts on the organization. The term is traced back to the mid-1970s. While the terms "environmental scanning" and "issues management" seem to be practically synonymous, an argument could be made that the former is contained within the latter; a preliminary search of *ABI/Inform* (see the last article of this issue) indicates that they have individual literatures with a small degree of overlap.

Hohhof (1994) proposes a set of three practical explanations of terms:

- [Business intelligence (BI)] is the organizational means by which information about a company's external environment is systematically collected, processed, analyzed, and distributed to managers responsible for taking whatever action is called for. Such a system organizes the flow of critical information and focuses it on important operational and strategic issues and decisions (p. ix).
- Intelligence information is made up of data compiled from an organization's external environment through a focused, continuous collection process. When analyzed in concert with the internally gathered data contained in the company's general IS [information system], intelligence information gives managers as complete and as accurate an understanding of the external environment as possible and helps them reduce the uncertainty associated with their decisions (p. x).
- Competitive information systems (CIS) help managers stay abreast of market and world events. Using information technology to keep companies ahead of the competition, CIS does not simply deliver large amounts of information: it provides the information managers need to make informed decisions (p. xi).

Despite many admirable attempts to define them, the terms used to describe the activities discussed in this issue overlap or are interchangeable in practice. As Samuel Johnson admitted, language is a living changing thing, and any attempt we may make to prescribe usage may, at most, slow the changes.

How is Competitive Intelligence Applied?

Uses of data acquired by competitive intelligence professionals are as varied as the activities of organizations in general. In the broadest terms, CI is information that supports positive change in an organization. More specifically, a Conference Board, Inc. survey reported the following examples of decisions relying on monitoring information (Sutton, 1988): pricing, strategy, new products/services, acquisitions, changes in manufacturing capacity/processes, product specifications, sales force changes, advertising/promotion, and joint ventures (p. 20).

The Competitive Intelligence Profession

Is competitive intelligence a profession? The status of librarianship as a profession has received frequent attention in the literature. Very few writers discuss CI as an independent profession. There are attributes of CI that can be categorized as professional; yet, on the whole, it may be difficult to so class CI activities in general (of the many works concerned with professional attributes, the following may be recommended: Abbott [1988], Freidson [1986], Hernon [1991], and Winter [1988]). Following is a short list of professional attributes against which CI activities may be compared. For several a clear match with librarianship would seem to exist; however, for others, a correspondence is less clear:

- a profession is supported by a specialized body of practical and theoretical knowledge;
- professionals have a service orientation;
- a demand exists for professional services;
- professional organizations exist and may be concerned with the following: identifying professional functions, determining professional standards, and certifying competence;
- there exist relationships between professions and formal systems of higher education;
- there exists a minimum expected level of educational attainment for professionals;
- criteria exist for evaluating professional achievement;
- society recognizes the importance of professions;
- there exists a system of rewards;
- a sense of autonomy and community exists within a profession;
- a professional-client relationship exists;
- a large-scale commitment is required of professionals; and
- professionals maintain a monopoly on their services.

The number of these attributes that apply to CI activities may be dependent upon the location and nature of CI activities in a given organization. Addressing the issue more directly, Fahey (1990) applies five tests of professionalism specifically to CI:

1. A Knowledge Test, which identifies the presence of a unique knowledge base, a knowledge base that is constantly being enhanced, and knowledge codified in the form of principles, practices, and standards.
2. An Intellectual Test, which demonstrates the presence of two related intellectual characteristics: distinct thought processes and diagnostic processes.

3. An Operations Test, which addresses a shared conception of what constitutes specific CI functions and tasks.
4. A Decision Making Test, which demonstrates that abilities to perform recognized decision relevant roles within organizations are present and that they are broadly similar across organizations.
5. A Value Test, which is concerned about the presence or lack of a demand for CI practitioners and seeks evidence about the degree to which they are valued by organizations (pp. 1-4).

Fahey believes that CI practitioners in general do not meet these criteria and suggests that, in order for the field to achieve the status of a profession, much attention would have to be paid to "establishing the parameters of a requisite knowledge base, relevant conceptual and thinking skills, clearly specified tasks and functions, potential decision making roles, and value enhancing contributions" (p. 4).

Competitive Intelligence Education

Closely related to the professional character of competitive intelligence are educational issues. Where in existing systems of higher education should training for such an interdisciplinary group of activities take place? While it has been suggested that such education be provided in specialized institutes (see the Miller article about education in this issue), there presently exist scattered courses in schools of business and of library and information science. At Boston University, Liam Fahey has taught "Competitor Analysis" in the MBA program (Leonard, 1990, p. 5). Besides required readings (about sixty articles and nine books), the course requires analyses of five business cases, three to five short papers, an analysis of an organization, and one large paper developing a comprehensive framework for studying some aspect of a competitor's strategic position. At least two schools of library and information science provide CI courses—Simmons College and Indiana University. Going beyond "business reference sources and services," the courses target those interested in acquiring more specialized analytical skills or those considering CI careers.

The Contributions to This Issue

This issue of *Library Trends* includes contributions about various aspects of the general subject of strategic intelligence, including the following:

- suggestions of innovative uses of electronic sources in identifying issues of potential strategic importance;
- a case study of environmental scanning behavior of managers in a large manufacturing corporation;

- a study of chief executive officers' acquisition and use of information about their business environments;
- a summary of corporate CI activities from a practitioner's perspective;
- a suggestion that CI activities have applications outside business;
- discussions of the CI profession, education, and competencies; and
- a CI literature review.

Lancaster and Loescher examine the role of corporate librarians in issues management. The issues of concern, which could include large-scale economic or legislative events, social issues such as health or the environment, or technological advances, have potential organizational impact and are monitored for purposes of strategic advantage. The authors suggest that corporate librarians augment the traditional scanning of relevant print and electronic literature by taking advantage of databases to track issues or trends. This can be accomplished by observing increases in numbers of references and increases in numbers of databases in which an idea occurs, and by tracking movement of the issues from narrow literature to those reaching broader audiences.

Two articles are concerned with environmental scanning. Reporting the results of a case study of a Fortune 500 manufacturing firm, Miller examines the relationships between aspects of corporate culture and the frequency of environmental scanning activities. The study, which was prompted by an observation that organizational success and scanning frequency tend to be related, describes the scanning behaviors of 220 managers. Auster and Choo highlight the primary functions of environmental scanning in a study of the acquisition and use of information about business environments by chief executive officers in the Canadian publishing and telecommunications industries. Their work was driven by concern about: (1) relationships between perceived environmental uncertainty and the amount of scanning, (2) effects of source characteristics and environmental uncertainty on the use of information sources in scanning, and (3) ways in which environmental information is used by CEOs in decision making. Such studies greatly enrich the research base in a field in which many decisions about implementation of CI or related systems are made on an informal basis. The studies, supplemented by their cited literature, can serve as models for systematic examinations of other industries or individual organizations.

Providing a front-line practical perspective for this issue of *Library Trends* is Bonnie Hohhof, a prominent figure in the competitive intelligence community, the author of a recent book about CI

system design, and the editor of the leading CI journal. Hohhof briefly summarizes corporate CI activities and describes in general terms the most important practical issues of concern to information managers. In so doing, she frequently refers to information, professionals, and activities with a specialized vocabulary—one that is descriptive and, as a quick scan of the professional literature will demonstrate, current. Some terms are well entrenched in business information jargon ("business intelligence" or BI—of course not to be confused with *Biography Index, Bibliography Index,* or "bibliographic instruction") and some less so ("competitive intelligence" or CI). Terms may seem redundant or unclear ("intelligence information"), but these all have definite meanings in practice. "Intelligence information" is not "intelligent information" and is also not the opposite of "unintelligent information"; the term merely distinguishes one category of information from another. Some terms, which are easily understood in general contexts, have specialized meanings in a CI environment: "human intelligence," for example (or as Hohhof indicates as an alternate, "humint"), refers to an investigative activity in which information is gathered from human primary sources. Hohhof also refers to "cybrarians." This term is not new to many librarians and information professionals, especially those familiar with the Internet, and it has been criticized for being unnecessary, faddish, and linguistically inaccurate. In defense of *cybrarian,* its occasional use simply calls attention to the expanding roles of librarians, especially in business and electronic environments. Those who propose the term are emphasizing an important point and are not generally calling for it to replace "librarian." Those of use who believe the latter term is perfectly appropriate for an evolving profession need not fear that we will soon, or ever, be reading issues of *Cybrary Trends.*

In their article about CI and social advantage, Davenport and Cronin propose that the concept be "more generally operationalized in terms of social advantage." The authors examine CI from several perspectives: academic, governmental (nonmilitary), commercial, and demotic. From the esoteric to the ordinary, the applications they discuss include diverse data types present in CI systems, the role of electronic networks in such operations, "cooperative intelligence," and competencies for CI professionals.

Linked to the latter portion of their article is the treatment of educational issues by Miller, who teaches a business intelligence course at the Graduate School of Library and Information Science at Simmons College. Miller discusses relevant terminology, outlines major competitive intelligence functions, and proposes professional competencies. One of very few writers to address the status of CI as

a profession, Miller suggests means of establishing an appropriately interdisciplinary curriculum and describes the role of formal education in the careers of intelligence professionals.

Lastly, a guide to the literature of competitive intelligence has been provided for those who would like to learn more. Important books and articles are introduced and a short study of the coverage of CI in periodicals is presented in order to provide a glimpse at an "information" literature that lies almost completely outside that of library and information science. However, the literature, in whatever form, represents only a small part of current CI activities. The field is changing quickly, and the leaders of the field are not always inclined to reflect and write about what they do. CI practitioners communicate efficiently among themselves in their primary professional organization, the Society of Competitor Intelligence Professionals (SCIP), and many are also active members of the Special Libraries Association.

As the articles in this issue state or imply, librarians and other information professionals have been under-represented in CI and related activities. By taking advantage of specialized education, innovative methods, advanced technologies, and personal contacts, information professionals can demonstrate the strategic importance of their services.

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The Corporate Library and Issues Management

F. W. LANCASTER AND JANE LOESCHER

ABSTRACT

THE ONLINE DATABASES THAT LIBRARIANS use routinely in literature searching and current awareness activities might also be used to track the diffusion of ideas and, thus, to identify issues of potential significance to the organization.

INTRODUCTION

A number of studies have shown that corporate libraries are frequently underused and the services of the librarian undervalued (Slater's study [1984] may be the most telling of these, but it is not the only one). While the ability to exploit a wide variety of bibliographic and other types of databases in electronic form has given the corporate library much stronger weaponry than it had in the past, there is no real evidence that this has enhanced the image and status of the librarian in most institutions. Moreover, the increasing ability of scientists, engineers, and other professionals to access databases themselves, either online or as CD-ROM, threatens the role of the librarian as an intermediary seeker of information.

Under these circumstances, it is important for the librarian to look for new means of serving the organization. In particular, the librarian should seek ways of exploiting the power of the electronic databases to develop innovative services that managers can recognize as having tangible value. A possible service of this kind is the recognition and tracking of issues of potential significance to the

F. W. Lancaster, Graduate School of Library and Information Science, 501 E. Daniel Street, University of Illinois, Champaign, IL 61820
Jane Loescher, Graduate School of Library and Information Science, 501 E. Daniel Street, University of Illinois, Champaign, IL 61820
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corporation—that is, the exploitation of bibliographic resources to support issues management.

Issues management is related to strategic planning and to technological and social forecasting. In essence, an issues management group, within a corporation or other organization, attempts to identify technological or social issues likely to have positive or negative impact on the institution at some future date. That is, it looks for potential threats and opportunities (Jackson & Dutton, 1988). It may also be responsible for recommending a course of action through which the organization can adapt to changing conditions created by a particular issue. One obvious example of "changing conditions" would be legislative or regulatory action affecting its operations, services, or products. In some cases, the organization may actually be able to benefit from the changing conditions. In other cases, it tries to adapt in order to minimize the negative impact of the changing conditions. Clearly, issues management will be most successful if those responsible can identify candidate issues at the earliest possible moment, thus giving the organization time to assess possible outcomes and to initiate necessary actions. Meng (1992) gives a useful example of the importance of identifying issues early. "Holds on deposits" (the refusal of banks to credit deposits until checks clear) became a public concern in 1982 when it was discussed on television and in newspapers, prompting several thousand letters to members of Congress and subsequent House and Senate hearings. An issues analyst at the Bank of America had actually identified this as a potentially important issue as early as 1977, allowing the bank to have some influence on the form of the regulatory action taken.

Stanley (1985) points out that the phrase "managing issues" "became a vogue term in the late 1970s" (p. 3). He regards issues management as a logical outgrowth of "public relations" in the original meaning of that term—i.e., seeking the consent and support of society (pp. 3-5). Heath and Nelson (1986) trace the term "issues management" to the mid-1970s and consider it closely related to "advocacy advertising" (p. 12).

Stanley (1985) talks of the importance of being able to anticipate issues and of having a systematic approach to "scanning" to identify issues likely to have some impact on the organization (pp. 187-88). He recognizes five arenas in which such issues might emerge: economic (i.e., changes in the standard economic indicators); social (e.g., public attitudes); political (e.g., changes in government policies or priorities); technological (e.g., new devices or techniques); and other (e.g., environmental, health, or safety concerns).

The process of scanning is now frequently alluded to as "environmental scanning," and a comprehensive review of the literature on this topic, not restricted to scanning for issues management purposes, has recently appeared (Choo & Auster, 1993).*

One would think that such scanning should involve a substantial literature component—the scanning of the published literature and, more importantly, the semipublished literature (e.g., conference papers and technical reports). However, most organizations seem to downplay the value of literature scanning, preferring direct people-contact approaches, such as focus group interviews, delphi studies, and surveys of opinion leaders. Choo and Auster (1993) point out that: "Impersonal sources, such as the library and online databases, are not often used in scanning" (p. 296).** A report by Keegan (1974) on the scanning practices of multinational corporations notes that none of the organizations in his sample had any formal system for monitoring published literature.

When literature scanning is used in support of issues management, it seems a rather haphazard operation. As described by Stanley (1985), who refers to it as the trend evaluation and monitoring (T.E.A.M.) approach, it involves "volunteer scanners" (p. 189). Each such individual monitors certain publications to look for "trends or discontinuities of potential long-range concern to society..." and to the organization. Relevant items are clipped, copied or abstracted, and reviewed, every so often, by a team charged with producing a trend analysis report for management. Not surprisingly, perhaps, Stanley regards the process as time consuming and error prone.

Some other writers on scanning for issues management purposes are not quite so negative about the literature scanning approach. For example, Culbertson et al. (1993) devote about five pages to what they refer to as "[b]ackground reading with library and computer" (p. 33). While they list quite a few potentially useful published sources, including databases, they do not seem very knowledgeable on how to exploit these resources effectively, referring to this particular approach merely as "browsing." Some other writers (e.g., Ewing, 1987, p. 61) see electronic databases only in terms of refinding items that someone remembers seeing or having in the past.

That the corporate librarian is not considered a particularly valuable player on the issues management team should not come as much of a shock to us. Much more surprising is the fact that,

*The term "environomental scanning" actually predates "issues management." Preble et al. (1988) trace it to Aguilar (1967).

**In actual fact, most of the literature on issues management makes little or no reference to how scanning is achieved.

while librarians and information specialists have no trouble in recognizing the potential value of the corporate library in other scanning activities (e.g., articles on the role of formal information services in "competitive intelligence" appear fairly often), they seem completely oblivious to its potential value in issues management. A search of the *Library and Information Science Abstracts* (LISA) database back to 1969 brought only three hits on the term "issues management"—an article by Lancaster and Lee (1985) and two project descriptions derived from work presented in the 1985 article.

In what way can the corporate library contribute to issues management activities? Most obviously, of course, relevant literature scanning is best performed within the library by professional members of the staff. Indeed, many industrial information services routinely scan vast quantities of incoming literature to prepare an in-house bulletin of abstracts or some other current awareness device. The production of a "trend analysis" report is a logical extension of this function.

Use of Databases to Track Issues

It is in the exploitation of electronic databases that the librarian might best support the issues management function. Once a candidate issue has been identified, perhaps through conventional literature scanning within the library, databases can be used to track the progress of this issue within the literature.

A candidate issue might be considered to have emerged as a "real issue" when one or both of the following occur:

1. There is a sudden dramatic increase in the number of references to the issue in the published literature.
2. The issue moves from one kind of literature to another. In particular, the movement of an idea from the scholarly (or otherwise esoteric) literature to the popular literature, as exemplified by newspapers and popular magazines, is evidence that the issue has come to the attention of the public at large. This implies that the issue is of public interest and possibly of public concern. Some public concerns eventually lead to legislation, regulation, or other official action.

It is clear that databases readily accessible online can be used to track the diffusion of ideas and to identify those in which interest is growing as exemplified by: (1) a great increase in the number of references, (2) a substantial increase in the number of databases in which the idea occurs, or (3) the movement of the idea from a limited-audience literature to a wide-audience literature.

The use of databases in this way is illustrated in the hypothetical example shown in Table 1. The idea, as represented by a particular term, occurs for the first time in database *A*, a pure science database, at time x. By the time $x + 1$ (which could be, say, six months later), not too much has occurred: database *A* records three further occurrences of the term between x and $x + 1$, and the term has moved into a second science database, *D*, with a single occurrence. At $x + 2$, activity is increasing: the topic is diffusing into additional databases, the number of occurrences is increasing, and the topic is recognized for the first time in an applied science database. Interest in the topic continues to grow in the period $x + 3$ to $x + 5$: it is covered in more science databases and more applied science databases, with increasing numbers of occurrences in each, reaches the general public (databases covering newspapers and popular magazines), and has even become a governmental concern (e.g., reached Congressional testimony).

TABLE 1
DIFFUSION OF AN IDEA THROUGH DATABASES (NUMBERS IN CELLS REPRESENT FREQUENCY WITH WHICH A TERM OCCURS IN THE DATABASE)

	Passage of time					
Databases by type	x	$x+1$	$x+2$	$x+3$	$x+4$	$x+5$
Pure science						
A	1	3	12	35	84	157
B			2	12	38	49
C			3	9	23	38
D		1	6	17	31	41
E				4	18	29
Applied science						
F			1	4	7	18
G				2	12	22
H				1	5	11
Popular						
I				1	8	22
J				1	5	17
K						
Governmental						
L						2
M						7

If one had plotted the diffusion of this hypothetical idea through databases accessible online, one might identify it as a potentially important issue at different points in time, depending on what indicator of concern/interest was adopted. At $x + 5$, it is of obvious concern because it is already being discussed in hearings before

Congressional committees—perhaps with a view to some form of legislation or regulatory action. Presumably, all organizations will have recognized the significance of the issue by then. However, one can argue that the potential importance of the issue could have been recognized by $x + 2$ as it spread into more science databases (especially if a number of different sciences are involved) and had reached the applied science literature (e.g., an article describing a possible solution or a possible application), and certainly by $x + 3$, at which time it had passed beyond the more scholarly literature and reached the popular press.

The potential value of this method in the tracking of issues has been demonstrated through a series of case studies, the results of which are summarized in Tables 2-5. In the case of acid rain (Table 2), which was used in a more detailed case study by Lancaster and Lee (1985), the term emerged in databases in 1971. If one's criterion for identifying a potentially important issue was a substantial increase in the number of occurrences of the term, one might not have spotted the acid rain issue before 1980 or 1981. If database involvement was the criterion, one might have been alerted by 1976 when the coverage had extended from one science database to four. However, one might reasonably claim that the issue could have been identified in 1974, by which time it had moved into both the applied science literature (seeking solutions) and the popular literature.

TABLE 2
DIFFUSION OF THE TERM "ACID RAIN"

	Passage of time											
Databases	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*
Pure science												
A	0	1	0	0	0	5	10	13	22	33	72	67
B	0	0	1	0	4	3	10	21	20	25	66	73
C	0	0	1	3	10	14	16	21	34	49	66	199
D	0	0	0	0	1	0	1	2	2	9	17	4
Applied science												
E	0	0	0	0	1	2	3	4	3	5	13	23
Popular												
F	0	0	0	0	1	0	2	4	4	24	29	32
Governmental												
G	0	0	0	0	0	0	1	0	0	3	55	85

Cellular radio (Table 3) presents a different picture. While involvement of multiple databases, or the rapid increase in number of references, would not have flagged this as an important technology

before 1983, the involvement of the popular literature would have done so at least one year earlier.

AIDS could have been identified as a significant concern by 1982 using either movement to the popular literature or frequency of term occurrence as the criterion (Table 4).

TABLE 3.
DIFFUSION OF THE TERM "CELLULAR RADIO"

Databases by type	*Passage of time*											
	1973	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*
Pure science												
A	0	1	0	0	0	2	0	1	3	9	39	149
B	0	0	0	0	0	0	0	0	0	0	3	3
C	0	0	0	0	0	0	0	0	0	0	2	1
D	0	0	0	0	0	0	0	0	2	3	3	9
Applied science												
E	0	0	0	0	0	0	0	0	0	1	5	9
Patents												
F	0	0	0	0	0	0	0	0	1	1	2	12
Popular												
G	0	0	0	0	0	0	0	0	2	42	62	68
H	0	0	0	0	0	0	0	0	0	5	23	43

TABLE 4.
DIFFUSION OF THE TERM "ACQUIRED IMMUNE DEFICIENCY OR "ACQUIRED IMMUNODEFICIENCY"

Databases by type	*Passage of time*										
	1974	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*
Pure science											
A	0	2	1	0	5	1	2	1	33	643	1163
B	0	0	0	0	0	1	2	3	23	407	934
C	0	0	0	0	0	0	0	0	3	120	157
D	0	0	0	0	0	0	0	0	1	33	77
Popular											
E	0	0	0	0	0	0	0	0	8	78	87
F	0	0	0	0	0	0	0	0	12	80	127
Governmental											
G	0	0	0	0	0	0	0	0	0	6	3

Table 5 shows how the technique can be applied to an issue that is "social" rather than one which is in the science/technology arena. For the sanctuary movement, it is diffusion to the popular

literature that gives the best signal of interest in and concern with this issue.

(Parenthetically, it is worth mentioning that this technique of plotting the movement of terms through databases can be used in database evaluation. For example, in Table 4, note how database *A* picks up the significant term some four to five years before other databases; in the use of cellular radio, database *A* is seven years ahead of other databases.)*

TABLE 5.
DIFFUSION OF THE TERM "SANCTUARY MOVEMENT"

	Passage of time						
Databases by type	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*
Scholarly							
A	0	1	2	9	11	48	52
B	0	0	0	0	0	3	0
C	0	0	0	0	0	6	1
D	0	0	0	0	0	1	0
E	0	0	0	0	0	1	1
F	0	0	0	0	0	1	4
Popular							
G	0	0	0	0	3	67	61

The technique of tracking the diffusion of ideas through databases need not involve the preselection of databases. It can be implemented through the use of database indexes (i.e., databases that reveal term occurrences in other databases). Indeed, the data of Tables 2-5 were extracted from Dialindex.

It is not our claim that the use of databases to track the diffusion of ideas can replace all other methods for the identification of candidate issues. Nevertheless, this form of database tracking can certainly be a powerful weapon in the armory of an individual or group charged with strategic planning or technological/social forecasting.

Of course, the technique does not substitute for human judgment. It does not automatically identify an issue as "significant" to an organization. But it does flag issues that should be looked at more closely or whose progress should be further observed. For example,

*Since this article is not concerned with the evaluation of databases per se, the databases are not identified. The databases vary considerably from case study to case study (e.g., database *A* in Table 3 is not the same as database *A* in Table 4). Moreover, in the interest of simplification, not all databases in which the terms occur are included in the figures, although the most significant ones (in terms of illustrating the technique) are.

the movement of the term "acid rain" into the popular press in 1974 (see Table 2) could have caused some organizations to seek out the item involved. The very provocative way in which the topic was presented ("The Acid Threat," 1974) should have suggested the fact that this might well become an issue of great public concern. The same situation applies to the early references to AIDS in the popular press (see Ver Meuler, 1982).

While the technique described is a powerful tool for tracking the progress of potentially significant issues, it does not contribute directly to the more difficult problem of identifying the ideas to be tracked. Put differently, one can plot the diffusion of "acid rain," "cellular radio," "AIDS," and "sanctuary movement" through the various databases retroactively because one now knows that all of these emerged as, in some sense, significant issues. But how would one have known, for example, that the term "acid rain" should have been tracked from 1971 onward?

Database exploitation could be of even greater value in issues management if the databases could be used to identify automatically the terms that should be tracked. This is not as farfetched as it might seem initially. What is needed is a method for automatically recognizing terms that had never occurred in databases before. Unfortunately, the database indexes, such as Dialindex, are not of much help in their present form because they are based on the occurrence of single words rather than compounds. For example, Dialindex could not be used to identify "acid rain" as a new term in 1971—the number of occurrences of "acid" and of "rain" both increase but "acid rain" does not get into the database.*

Nevertheless, a powerful computer could be used to recognize word combinations that had never before occurred in a particular database, and programs could perhaps be written to automatically eliminate the more obviously nonsensical of these. The remainder could then be reviewed by a planning or forecasting team to identify terms that seem to be worth tracking in one of the database indexes. Certain databases are likely to be particularly valuable in the identification of newly occurring terminology. In science and technology, databases that cover conference papers and technical reports would be obvious candidates. Garfield (1986) has described how the Institute for Scientific Information databases can be used to identify new terminology. While the tool he describes (the *Unique Word Dictionary*) is of some potential value in the identification of significant issues, it is not fully adequate because, again, it is based only on

*Compounds become searchable when they begin to be used as descriptors from a thesaurus or otherwise appear in an index term field in bibliographic records, but this is usually long after the term has occurred in titles or abstracts.

single words and hyphenated compounds and only on words in titles (a completely new term may be more likely to occur in an abstract than in a title).

Conclusion

Writers on issues management consistently undervalue the published and semipublished literature as a source for the identification and tracking of issues. Even when the value of the literature is acknowledged, these writers exhibit woefully inadequate knowledge of the appropriate access tools and how to exploit them. For example, Heath and Nelson (1986) tell us that:

> (we might suggest that one monitoring strategy is to look at standard research guides, such as the *Business Periodicals Index* or the venerable *Reader's Guide to Periodic (sic) Literature,* to note when a topic becomes so well established that it is used to index articles. We can also estimate the extensiveness of discussion by noting the number of articles under a topic and the kinds of publications in which they are printed). (p. 165)

While Heath and Nelson have the correct general idea, their implementation leaves a lot to be desired.

A few mentions of electronic sources do occur in the literature of issues management, but they refer to sources of numerical/statistical data (e.g., economic indicators or census data) rather than of bibliographic data. There is little evidence that the databases used routinely by librarians in their literature searching and current awareness activities have been applied to issues management functions.* Issues management is an arena in which the librarian might well be able to offer significant new services to management.

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The Relationships Between Organizational Culture and Environmental Scanning: A Case Study

JERRY P. MILLER

ABSTRACT

CULTURAL VALUES COALESCE INTO an interpretive framework through which decision makers subjectively perceive events and actions within the business environment. Based on this premise, this case study describes how differences in organizational values influence the frequency with which decision makers use oral, written, and electronic sources of information for environmental scanning. Interview and survey data from upper- and middle-level managers within a Fortune 500 manufacturing firm were gathered. Subsets of the data suggest that organizational values influence scanning frequency. In addition, overall regression models provide evidence of the importance of job function and culture membership in determining scanning frequency for this population.

INTRODUCTION

The intelligence function comprises the collection, analysis, and dissemination of information about events in a company's external environment to decision makers and/or strategists (Aguilar, 1967; Porter, 1980). This case study examines a major component of the collection phase—environmental scanning—which is the acquisition of "information about events and relationships in a company's outside environment, the knowledge of which would assist top management in its task of charting the company's future course of action" (Aguilar, 1967, p. 1). When an organization places a high priority on external information, its decision makers access various sources to aid their

Jerry P. Miller, Graduate School of Library and Information Science, Simmons College, 300 The Fenway, Boston, MA 02115-5898
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strategic planning. The apparent connection between organizational success and scanning has prompted the examination of this activity. The strategy literature considers scanning as the stimulus that initiates the organizational adaptation process (Hambrick, 1981; Pfeffer & Salancik, 1978). The popular literature often profiles firms which sustain profitability and success through their reliance on pertinent information. In fact, after twenty-five years, the scanning literature includes at least thirty-five conceptual and empirical journal articles as well as ten doctoral dissertations. However, starting with its pioneers—Aguilar (1967) and Wilensky (1967)—authors frequently stated that minimal attention had been given to the topic of scanning (Kefalas & Schoderbek, 1973; Pfeffer & Salancik, 1978; Hambrick, 1981; Daft & Weick, 1984). Most recently, Choo and Auster (1993) underscored the critical need to expand the understanding of this activity. Despite the continued attention, why have the insights and findings from these studies not produced a clear understanding of scanning behavior?

Ignorance of previous work as well as imprecise analysis may provide some answers to this question. More essentially, however, this research has routinely overlooked the fact that scanning is a behavior which managers perform within their specific setting (Katzer, 1987). Traditionally, scanning studies focused on information sources and their systems as well as quantifiable organizational phenomena. Researchers isolated relatively objective factors to demonstrate statistical significance for possible generalization. Although these works produced various insights, objective external factors do not reflect the ambiguous and inconsistent nature of scanning as a behavior. Therefore, studying the process of how managers scan within their work setting can yield interesting and useful insights for further investigations as well as for the design and implementation of scanning processes. Given this perspective, the objective of this case study is to describe how 220 managers within a Fortune 500 manufacturing firm scan the environment and how attributes of their organizational culture affect this activity.

Researchers have examined the influence of corporate culture values on certain aspects of the information-seeking behavior of managers, but environmental scanning has not been studied. These studies illustrate that organizational values focus information processes and thereby indicate what sources managers can use and what alternatives they can consider within the decision-making process (Cyert & March, 1963; Galbraith, 1974; Feldman & March, 1981; Schwartz & Davis, 1981; Schein, 1983; Smircich, 1983; Wilkins, 1983; Huber, 1984; Ulrich, 1984; Lorsch, 1985; Schein, 1985; Lenz & Engledow, 1986). Over time, however, existing norms become so

embedded within policies and processes that they create a distinct organizational myopia (Ouchi & Wilkins, 1985; Huber & Daft, 1987). Consequently, the organization's perceptual filter becomes impervious to external change (Sathe, 1983; O'Reilly, 1983; Lorsch, 1985; Reiman & Wiener, 1988). In addition to focusing this process, cultural factors also influence acquisition. Dewhirst (1971) observed that information-sharing norms affect the degree to which information channels are open or closed. When values encourage managers to hoard information, the organization loses internal transparency and its resiliency to market fluctuations. Furthermore, in their examination of the relationships among information acquisition and five organizational climate scales (democratic governance, support, esprit, freedom, and innovation), Samuels and McClure (1983) concluded that effective information processing occurs in open, rather than closed, organizations. Finally, in a study of 695 employees in a public utility, Muchinsky (1977) found that the climate dimensions of interpersonal milieu, organizational structure, and procedures correlated with the use of interpersonal information sources. These studies offer evidence that culture can affect the selection of alternatives for consideration within decision making as well as the processing of information. However, the relationship between organizational values and environmental scanning has not been studied (Wilson, 1981; O'Reilly, 1983; Culnan, 1983, 1985; Huber & Daft, 1987). As with other information processes, cultural values could also affect the extent to which managers acquire external information for future internal dissemination and decision making.

Theoretical Framework

The specific assumptions and definitions that form the theoretical foundation of this case study are clarified to provide better appreciation of the factors and their proposed relationships.

Describing scanning behavior presumes the adoption of a suitable definition for information, which is "stimuli (or cues) capable of altering an individual's expectations and evaluation in problem solving or decision making" (Ungson et al., 1981, p. 117). Similar to most stimuli, managers' receptiveness to information cues, including unexpected, unfamiliar, and potentially critical information, can deviate. Cultural values can circumscribe their receptiveness to stimuli.

A case study of scanning behavior also presumes an appropriate conceptualization of scanning. Managers can acquire information about events and relationships in their company's outside environment by using formal and/or informal methods as well as various oral, print, and computer-based sources of information. Formal

methods may include the assistance of information brokers, information professionals, online services, and attendance at formal presentations. Informal methods include serendipitous exchanges with colleagues and staff members and skimming printed materials. However, use of the three media types (i.e., oral, written, computer-based) varies.

Early user studies endeavored to determine the effectiveness of information sources, or the criteria that governed users' selection of information sources. These investigations of information-seeking behavior often referenced Zipf's "law of least effort" (1949), which states that users base their selection of information in terms of the work required to gain access to the source. Building upon this premise, an early investigation of Allen (1966) found that information quality had no relationship to frequency of using written or oral sources. In a related study, Rosenberg (1967) concluded that research and nonresearch personnel preferred to access information sources that were easy to use rather than because of the amount of information which they provided. In their study of electrical engineers, Gerstberger and Allen (1968) investigated the criteria employed when selecting various oral and written technical information sources. Accessibility not only determined the overall frequency of source use, but also the choice of first source. In many instances, subjects preferred using oral sources due to their relative accessibility and ease of use. In contrast, due to its sophisticated nature, some engineers did not understand and, therefore, were reluctant to use their professional literature. The perception of such sources as inaccessible or difficult to use prompted their hesitancy. Therefore, perceived accessibility as well as ease of use greatly determined the degree of experience in using a source. Of most interest, the criteria of perceived technical quality was of little importance in relationship to frequency, first selection choice, as well as degree of experience. These engineers sought access to sources which required minimal effort with a lack of attention to quality. Therefore, these investigations suggest that "law of least effort"—specifically accessibility and ease of use—prompts the use of oral sources.

A case study of scanning behavior also assumes the identification of those who are most likely to perform this activity. Every manager within an organization need not access external information; rather, decision makers are responsible for selecting from among various alternatives in planning future actions or justifying actions already taken (March & Simon, 1958; Cyert & March, 1963; Weick, 1979). Therefore, measuring the frequency with which decision makers scan the environment is appropriate (Hambrick, 1982).

Building upon these concepts, the theoretical framework also incorporates concepts within the open systems model that emphasizes organizational flexibility and change with its external environment. As with any system, an organization can sustain itself by interacting with its external environment or by feeding upon itself. Open and adaptive organizations possess a highly permeable boundary or filter; closed organizations possess an impenetrable boundary. Theorists caution that perceptual screens, cognitive filters, or schemas can trigger a strategic myopia that can affect the degree to which managers engage in environmental scanning (Dearborn & Simon, 1958; Cyert & March, 1963; Lawrence & Lorsch, 1967; Miles et al., 1974; O'Reilly & Roberts, 1974; Connolly, 1977; Argyris & Schon, 1978; Huber, 1984; Lorsch, 1985). Furthermore, an organization's culture embodies the values and norms which support the extent to which managers can scan the constantly changing external environment (Means, 1969; Tichy, 1982; Reiman & Wiemer, 1988). These cultural values influence environmental scanning by determining the extent to which the organization's boundary is open or closed (Sathe, 1983; Samuels & McClure, 1983; O'Reilly, 1983; Lorsch, 1985; Reiman & Wiener, 1988). Therefore, this theoretical framework regarding the permeability of an organizational boundary incorporates the concept that cultural values influence how managers scan the external environment.

Managers cannot collect all relevant information in the external environment (Daft et al., 1988). The reasons for this inability are twofold: bounded rationality and the boundless business environment. Managers experience bounded rationality (Simon, 1957) and, therefore, cannot comprehend the degree of fluctuations occurring within a vast and complex external environment (Cyert & March, 1963). The concept of bounded rationality suggests that individuals have perceptual and information-processing limits. Although managers may want to act rationally, they must accept their limits. This limited function includes acting upon sufficient rather than complete knowledge as well as using simple rather than complex search strategies for problems and consistently using shortcuts. Within these limits, they attempt to understand the boundless business environment, which is defined as "the relevant physical and social factors outside the boundary of an organization that are taken into consideration during organizational decision making" (Duncan, 1972, p. 314). In addition, the environment can be conceptualized as consisting of two layers (Bourgeois, 1980; Dill, 1958). The layer closest to the organization is the task environment whose sectors of competitors, suppliers, and customers have direct transactions with the organization. The outer layer is the general environment that includes the governmental, economic, and technical

sectors with which the organization has a comparatively indirect relationship. Assigning these specific sectors into either the task or general environment depends upon how administrators choose to define and interact with their corporate domain. For example, for a manufacturing firm, the task environment may consist of the customers, suppliers, competitors, and technology sectors. Therefore, the notion of bounded rationality and the magnitude of the external environment creates problems for studying scanning behavior. However, researchers can incorporate these cognitive limitations into their interpretation and analysis as well as include the sector names in the instruments that measure scanning frequency, thereby easing managers' conceptualization of the external environment.

How values affect this scanning activity presumes an appropriate conceptualization of organizational culture. The organizational culture literature offers multiple perspectives on studying culture. As Martin (1992) emphasizes, organizational culture researchers have developed three social scientific perspectives: integration, differentiation, and fragmentation. Within the integration perspective, all cultural manifestations support the same values, which members across the entire organization share unquestionably. Ambiguity is eliminated. Within the differentiation perspective, cultural manifestations occasionally support the same values because consensus develops within subcultures, whose values often conflict with those of other groups. Here, ambiguity is controlled. Within the fragmentation perspective, ambiguity itself generates organizational culture. Members reach consensus and disagreement on specific issues; therefore, consensus does not occur within subcultures or across an entire organization. Here, blurring and inconsistencies dominate. However, a particular perspective does not depict an organizational culture more accurately nor more objectively. Although each perspective captures some cultural aspects more fittingly, each one also ignores and distorts other features. A single perspective fails to dominate the literature because each is an interpretative framework which a researcher chooses to impose on the procedures for gathering and evaluating the cultural data. Subjective factors and subjective judgments affect an entire study.

Therefore, this researcher chose the differentiation perspective. Experience has demonstrated that interpretations, assumptions, and values vary for numerous reasons, including educational background, economic status, task, function, race, gender, age, and ethnicity. To maintain status, employees assume the values of the formal and informal groups to which they belong. Consistency develops within these groups. Therefore, the integration perspective, with its notion that all employees share the same values, is unrealistic and simplistic.

As for the fragmentation perspective, its emphasis on multiple interpretations and its inclusion of ambiguities requires the use of an ethnographic approach whereby the researcher works within the culture for months or years to understand its subtle nuances. Lacking the time and the skills, this approach could not be taken.

As per the differentiation perspective, an organization's culture consists of multiple and competing interpretations and values that rarely coalesce into a unified whole. A conceptual framework that reflects this perspective is the competing values framework (Quinn, 1988). According to this theory, rather than one dominant culture, organizations demonstrate numerous subcultures in which each exhibit four culture types (Rohrbaugh, 1981; Quinn & Hall, 1983; Cameron, 1986; Rousseau, 1990). This model juxtaposes the counterbalancing dimensions of flexibility and control as well as internal stability and external focus. Within its four quadrants, the framework connects the assumptive bases of the desired organizational outcomes of effectiveness, leadership, and motivation within clusters of values that correspond to four culture types: (1) rational, (2) group, (3) hierarchical, and (4) developmental. By balancing the values that correspond to desired outcomes, organizations effectively respond to internal and external developments as well as promote individual well-being (see Figure 1) (Quinn, 1988).

Human Relations Model (Group Culture)	Toward Decentralization FLEXIBILITY	Open Systems Model (Developmental Culture)
Toward Development of Human Resources		Toward Expansion and Transformation
Toward Maintenance		Toward Competitive
of Sociotechnical Systems		Position in Overall System
Toward Equilibrium		Toward Maximization of Output
Internal Process Model (Hierarchical Culture)	Order/Stability Toward Centralization	Rational Goal Model (Rational Culture)

Figure 1. Competing values framework

The four clusters of values correspond to four culture models. The Rational Goal Model emphasizes order with a focus on the external environment. Within this rational culture, managers motivate

through competition and successful attainment of objectives by emphasizing the values of productivity, performance, achievement, and goal attainment. In contrast, the Human Relations Model emphasizes spontaneity with a focus on the internal organization. Within this group culture, managers motivate through attachment, cohesiveness, and membership by emphasizing belonging, trust, and participation. The Open Systems Model emphasizes flexibility and change with a focus on the external environment. Within this developmental culture, managers motivate through stimulation and variety, by emphasizing growth, resource acquisition, creativity, and adaptation. Finally, the Internal Process Model emphasizes predictability with a focus on the internal organization. Within this hierarchical culture, managers motivate through security, order, rules, and regulations by emphasizing the values of conformity, coordination, evaluation, and internal efficiency.

Based upon profiles that depict the intensity and congruence of these values, respondents recognize cultural imbalances from which to make appropriate adjustments. By unraveling cultural biases, managers recognize that values can become vices, and that an overemphasis of one culture type can cause imbalances and ineffective behaviors (Quinn & Kimberly, 1984; Campbell, 1988). The group culture becomes a country club; flexibility becomes turmoil; control becomes rigidity. By moving out of balance with a single-solution perspective, rational managers discourage individuals and misdirect organizations. To adjust these imbalances, effective managers think in contrasts—that is, they conceptualize opposite values simultaneously (Worthington, 1982; Simon, 1987). By intuitively using multiple frameworks, master managers motivate individuals as well as lead organizations effectively (Quinn, 1988).

The competing values framework also incorporates dimensions of human information processing (Quinn & McGrath, 1985; Quinn 1988). Both personal and organizational values regulate perceptual systems and information processes by circumscribing how managers receive and interpret information as well as by determining what alternatives to consider and what strategies to implement. When scanning the environment, perceptual systems distinguish information by its level of uniqueness and uncertainty as well as by its associated level of response time. These information-processing orientations correspond to the values within the four-quadrant framework. Rational managers display a focused orientation and seek independence and achievement within situations of high certainty and short response times. With reliance on previous knowledge, guidelines, and structures as well as with a single purpose, they establish a direction that ensures success. Within the Developmental

Culture, adaptive managers display an idealistic orientation and seek risk, growth, creativity, and change within situations of uncertainty and short response times. By relying on intuition and new ideas and with a multiple focus, they concentrate on possibilities that stress adaptability. Consensual managers, within a group culture, display a feeling orientation and seek interdependence and partnership within situations of uncertainty with long response times. Through an interactive decision-making process and with a multiple focus, they guide individuals toward harmony. Within the hierarchical culture, managers seek predictability and security within situations of certainty and long response times. Through systematic verification of facts, and with an emphasis on standards and the status quo, they strive with a single purpose for the best solution. Therefore, the competing values approach accommodates the personal orientations that influence information processing behavior (see Figure 2).

To summarize, using accessible and easy-to-use oral, print, and computer-based sources, decision makers receive stimuli about events

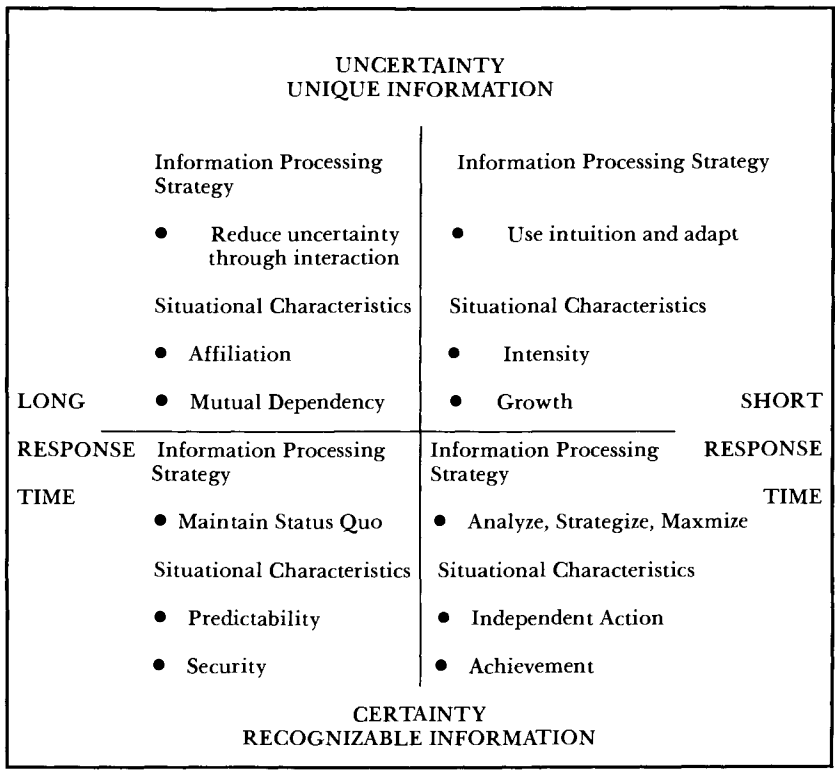


Figure 2. Perceptual differentiations and situational characteristics

and relationships in their company's environment. Although these managers strive to sustain their organizations by interacting with the external environment, their inherent bounded rationality and the boundless nature of the business environment sets limits. In addition, the organizational culture circumscribes scanning activities by focusing information processes and by indicating what sources managers can use and what alternatives they can consider within the decision-making process. Finally, scanning practices vary within the same organization due to the differentiated nature of organizational culture. This variance can be attributed to numerous factors including functional differences and rank within the corporate hierarchy.

Methodology

Recall that the objectives of this case study are to describe how 220 managers within a Fortune 500 manufacturing firm scan the environment and how attributes of their organizational culture affect this activity.

To maximize the possibility of assessing a full range of managers, a large multidivisional organization was sought. A Fortune 500 manufacturing firm that employed 13,500 individuals within its corporate headquarters, forty-two manufacturing plants, and over 100 distribution centers agreed to participate in this study. To ensure the support of management, cooperation was obtained from senior management. The chief executive officer distributed a letter that encouraged 269 upper- and middle-level decision makers to actively participate in this two-phase study.

Phase one consisted of semistructured interviews of seventy-seven upper and middle managers. This aspect of the study helped to ascertain the dimensions of scanning behavior as well as to appreciate the cultural context and thereby its meanings (Gregory, 1983; Riley, 1983). An understanding of how these managers shape their corporate reality was gained via these interviews and extensive observations of various organizational processes as well as numerous casual interactions with the managers over a three-month period (Morgan & Smircich, 1980). Based upon this information, questionnaires were developed and subsequently distributed during the second phase to 269 upper and middle managers. The quantitative results supplement the qualitative data to provide a portrait of impressions indicating how perceptions affect scanning as well as a chain of evidence justifying how scanning expresses cultural meaning (Jick, 1979; Yin, 1981; Schein, 1987; Van Maanen, 1979, 1988).

With the cooperation of senior management, a purposive sample for the interview phase was drawn from fifty-five managers who made

relatively significant decisions based upon information about the external business environment (Kerlinger, 1973). These individuals represented most aspects of corporate operations, including strategic planning, sales and marketing, engineering, research and development, operations, distribution, administration, finance, personnel, as well as information and legal services. These interviewees were located at corporate headquarters as well as at various plants within North America. To those initially selected, an additional twenty-two managers were included when the possible significance of their insights and comments became known to this researcher. Other researchers have used comparable samples to investigate similar relationships requiring broad population characteristics (Kefalas & Schoderbek, 1973; Blandin & Brown, 1977; Hambrick, 1982; Culnan, 1983; Daft et al., 1988; Tyler & Bettenhausen, 1989). This balanced purposive sample of seventy-seven interviewees maximized the possibility that the primary functional and managerial levels would furnish multiple portraits of organizational life.

For the questionnaire phase, and with the cooperation of senior management, a purposive sample was drawn from 269 decision makers within corporate headquarters, forty-two manufacturing sites, four research centers, and various distribution centers. In addition to the seventy-seven interviewees, the total sample consisted of representatives from the corporate executive council, senior management, middle management (i.e., the next few layers under the vice-presidents), senior functional areas, as well as supervisory personnel who report to middle management. This balanced purposive sample ensured the inclusion of individuals from the major functional areas and levels of responsibility within the corporation who would adequately describe the relationships under examination. A random sample may not have met this requirement. Furthermore, random assignment is not a prerequisite for the case study approach.

Data from the individual semistructured interviews provided an appreciation of the interconnections between values and scanning that existed within this firm. The interviews focused on: (1) how managers valued information, (2) how they used information for decision making, (3) how cultural values support control and flexibility; and (4) the organization's internal or external focus. Principles from organizational development, effective management, and fieldwork guided the interviews (French & Bell, 1984; Schein, 1987; Quinn, 1988).

After the interviewee reviewed a summary of the study (see Appendix A) and its purpose was clarified, the respondents addressed the following questions:

1. Do you understand why I am here?
   (*Purpose:* clarified purpose and ensured confidentiality.)

2. I would like to know about your job. Can you help me understand what you do on the job?
   (*Purpose:* focused the session on the interviewees prompting them to talk about their work and to reveal insights about their personalities.)
3. What sources of information do you usually use to find out about what's happening in the business world?
   (*Purpose:* explored the types of sources used and how external information was distributed through the company.)
4. Do you think the company/unit effectively responds to market shifts? Do you think that the company takes enough risks?
   (*Purpose:* described the managerial vision or framework that guides organizational adaptation.)
5. Who determines the direction of the company? Does that mindset help or hinder you in gathering information and formulating responses?
   (*Purpose:* identified the openness of the organizational ideology emanating from senior management and explored its implications for information distribution.)
6. How can this study help you in your work?
   (*Purpose:* revealed specific barriers which may not have been expressed.)
7. Are there any questions that I have not asked that I should have asked?
   (*Purpose:* permitted any unexpressed insights to emerge regarding the relationship between scanning and corporate values.)
   Thank you very much, I appreciate your cooperation. Be assured of my confidentiality and the anonymity of your responses.

An instrument consisting of a list of thirteen categories of sources measured scanning scope within six environmental sectors (see Appendix B). These categories include sources that are commonly used in most work organizations. As previous research has shown, although managers use multiple types of information for decision making, they rely on oral sources most frequently due to their high level of perceived credibility and accessibility (Duncan, 1972; Holland et al., 1976; Blandin & Brown, 1977; Huber & Daft, 1987; Daft et al., 1988; Tyler & Bettenhausen, 1989). Even though this pattern has been established, the instrument included categories within the principal media types of written, oral, and electronic sources. These categories have been successfully used in previous studies. Culnan (1983) indicated that these source categories adequately measured information source use and reported Cronbach alphas ranging from .60 to .81. Therefore, use of these categories maintained methodological consistency.

Furthermore, although the resulting 78-cell grid was initially imposing, the explication of the thirteen categories with reference to specific sources to which interviewees often referred may have prompted an ease of response. In addition, an explanation of the categories appeared on the page which preceded the grid; as it was not fastened to the survey, respondents refer to it while completing the grid.

Subjects indicated on an ascending five-point Likert scale from "less than once a year" to "daily" how often they used each type of source for acquiring information about events outside the corporation (Daft et al., 1988). The frequency method of measuring scanning scope has been compared with the interest and time methods and has been found to be highly reliable with Cronbach alphas ranging from .58 to .84 (Farh, J-L. et al., 1984). Reliability coefficients for this instrument range from .93 to .80.

To assess cultural values, the competing values instrument was used (see Appendix B). This survey instrument permits systematic investigations of organizational culture and its influence on behavior (i.e., environmental scanning). Furthermore, this quantitative measure enables researchers to make comparisons within and across organizations. From the aggregated responses to twenty-four value statements, six of which correspond to each of the four quadrants, the subsequent profiles represent perceived cultural strengths and weaknesses within each culture type. Respondents indicated the extent to which each item was presently valued as well as how much it should be valued in their work unit. Although the current profiles and the difference scores are primarily used in the analysis, the desired profiles may provide senior management with insights for future development. In addition, eight statements which address specific values of particular interest to senior management were included. However, these were not incorporated into any statistical analyses.

The competing values instrument emerged from an examination of organizational performance indexes (Quinn & Rohrbaugh, 1983). Organizational researchers and theorists evaluated the similarity of effectiveness criteria. Through the use of various multivariate techniques, a three-dimensional space appropriately depicted the similarities. Subsequent interpretations determined that the dimensions reflected: (1) the internal/external organizational focus, (2) the preference for stable/flexible structures, and (3) the means-end approach to desired organizational outcomes. Subsequent incorporation of organizational theories enriched the model, thus providing a robust multilevel framework for diagnosing and initiating individual and organizational change (Quinn, 1984; Quinn & McGrath, 1985; Quinn & Cameron, 1988).

The scales of the four culture quadrants have demonstrated high psychometric validity as well as a high level of reliability (Cronbach alpha from .84 to .77) (Quinn & Spreitzer, 1991). Both convergent and discriminant validity were confirmed in a multitrait-multimethod analysis as well as in multidimensional scaling. In addition, a spatial mapping produced nomological evidence justifying the relationships within and across the four quadrants. In this analysis, the reliability coefficients (Cronbach alpha) for the scales are: the developmental culture (.82), the group culture (.81), the hierarchical culture (.75), and the rational culture (.77).

In summary, three instruments were used during the two phases of this study. In phase one, a series of questions focused on the interviews. In the second phase, a nominally scaled instrument measured frequency of source use and a Likert-scaled instrument assessed cultural values. It should also be noted that, during the second phase, the survey instruments were pretested among fourteen managers who represented the primary functional and managerial levels within various sites of the firm. Because no changes were required, the three-part survey was subsequently distributed via interoffice and surface mail to 269 upper- and middle-level managers within corporate headquarters, the manufacturing sites, and the principal distribution centers. Follow-up telephone calls were made after the third and fourth week following initial distribution. A total of 269 managers received the survey, 220 (83 percent) responded. Of this total, 208 chose to complete the population characteristics section of the questionnaire. The survey sample primarily consists of male (92.3 percent), middle managers (69.2 percent), between the ages of 30-49 (93.7 percent), responsible for various manufacturing and distribution processes (81 percent), outside corporate headquarters (73.7 percent).

Data Analysis

Scanning Frequency

The sample mean of 2.21 (on a five-point scale) indicates that these managers use the thirteen source types to scan the six environmental sectors on an average of a few times per year. In addition, 75 percent of the population is at or below the scale-mean of 2.50, and 6.9 percent (fourteen managers) scan at least on a monthly basis. This mean frequency is relatively low in comparison with recent studies that used similar scales (Culnan, 1983; Daft et al., 1988; Watson, 1990). Further examination of these scores reveals that the most frequently used sources from among the seventy-eight-cell survey grid are subscriptions and conversations with peers and subordinates (see

Table 1). On almost a weekly basis, the managers read newspapers, magazines, and professional journals to follow economic developments as well as talk among themselves about competitors and customers. Monthly conversations to peers and subordinates about issues occurring within the six sectors predominate their mode of accessing environmental information. This survey data corroborates interview comments as well as research findings from previous studies which indicate that managers use oral sources more often than other media to obtain external information (Keegan, 1974; McLeod & Jones, 1986; Specht, 1987; Daft et al., 1988; Smeltzer et al., 1988).

TABLE 1.
MEAN FREQUENCY OF SOURCE TYPE PER ENVIRONMENTAL SECTOR

	Customers	*Competitors*	*Suppliers*	*Economic Conditions*	*Technological Issues*	*Regulatory Changes*
A. Subscriptions	2.568	2.445	2.288	3.786	3.059	2.440
B. Photocopied Articles	2.521	2.355	2.073	2.555	2.532	1.991
C. Books, Govt. Pub....	1.461	1.422	1.410	1.945	1.855	1.702
D. Written Materials Produced By	1.894	1.782	1.837	2.014	2.033	1.659
E. Other Written Materials	2.005	1.907	1.841	2.112	2.056	1.762
F. Conv. with Consultants	1.628	1.525	1.477	1.656	1.685	1.479
G. Conv. with Outsiders	2.573	2.243	2.356	2.650	2.359	1.875
H. Conv. with Superiors	3.621	3.205	2.872	3.277	3.032	2.297
I. Conv. with Subordinates	3.745	3.114	3.115	3.168	3.364	2.274
J. Conv. with Peers	3.768	3.314	3.096	3.391	3.236	2.292
K. Commercial Info. Serv.	1.741	1.685	1.628	2.023	1.597	1.553
L. Training & Development	1.647	1.436	1.429	1.489	1.735	1.413
M. Audio/ Visual	1.489	1.365	1.362	1.541	1.644	1.298

L: less than once a year
F: few times a year
M: monthly
W: weekly
D: daily

Additional insights emerge through a series of ANOVA analyses between frequency and the sample characteristics. Functional specialty categories significantly differentiate scanning frequency. As anticipated, engineers scan technological issues, accountants follow economic conditions, and marketers and salespeople search all sectors. With the exception of the technology sector, managers of information systems use sources the least. Interview comments regarding the task-oriented nature of most managers partially explain associations between function and use of particular source types. The characteristic of corporate location indicates that corporate personnel scan a bit more frequently than production managers with means of 2.32 and 2.16 respectively; economic, technological, and customer issues attract the most attention. Although corporate staff account for only 26 percent of the sample, their positions within finance, engineering, and marketing departments require them to use information more frequently than manufacturing personnel. Operational group categories also differentiate the scanning frequency. Examining the mean scores by operational group indicates that the corporate services and sales groups scan the regulatory (2.88), economic (3.31), and customer (2.59) sectors most often. Furthermore, as with the characteristic of functional specialty, managers of information systems within the distribution and logistics group use sources the least (1.97). This practice is related to the concentrated use of information systems for production and distribution processes, which require an internal focus. Also, a discrepancy exists between the powertrain and chassis product groups. Interview comments and observations revealed that political rivalries as well as differences in managerial focus exist which may, in turn, influence source use within these two product groups.

The comparatively high means for males within the customer (2.41), competitor (2.18), technological (2.35), and regulatory (1.88) sectors reflect the composition of the related departments; the overall mean for females is 1.79. Furthermore, scanning increases with age in all but the technological and competitor sectors. The greater number of engineers and marketers in the lower age groups explains this occurrence. Overall, however, frequency increases with age and, as other data reveal, with managerial level; as tenure and rank in the corporation increases, so does scanning frequency. Finally, management level categories also differentiate frequency. Although middle managers constitute 69 percent of the sample, their use dominates only the customer and technological sectors with means of 2.49 and 2.38 respectively. The number of engineers, sales personnel, and marketers explains this fact. However, the members of the executive council, who comprise 4.3 percent of the sample, are the most frequent users of external information in most sectors with an overall mean

of 2.41, which possibly indicates where the external focus of this corporation resides. In contrast, as anticipated, supervisors, whose responsibilities do not require the use of external information, scan the least in all sectors, with an overall mean of 1.97.

Aggregating the mean frequencies by source type into written, oral, and electronic media reveals similar patterns; specifically, managers use oral sources most often (2.67) and electronic sources the least (1.56). Upon examining frequency distributions, the majority of the sample scores for total use of written and electronic sources are at or below the scale mean; however, for use of oral sources, only 42.7 percent are at or below the scale mean. In summary, managers scan sources on an average of a few times per year, although they talk among themselves on a monthly basis about most environmental issues. The additional analyses not only reveal the anticipated relationships among function, managerial level, corporate location, and gender but also identify the most frequent scanners to be senior male executives, who, in this manufacturing firm, are marketers and engineers.

Corporate Culture

Culture was assessed from the responses of each manager to the twenty-four item Likert-scaled Competing Values Instrument. Managers were asked to describe the extent to which values currently operate in their own work unit as well as how values should be practiced. Based upon aggregate scores for each of the four culture types, the culture profiles graphically represent the actual and desired status of the four cultures.

The internal consistency as well as the underlying dimensions of the scales in the Competing Values Instrument were confirmed. The reliability coefficients (Cronbach alphas) for the scales are: the developmental culture (.82), the group culture (.81), the hierarchical culture (.75), and the rational culture (.77), which are similar to other findings (Quinn & Spreitzer, 1991). The factor analysis also verifies the four-factor structure of the instrument.

Results of Factoring the Competing Values Instrument

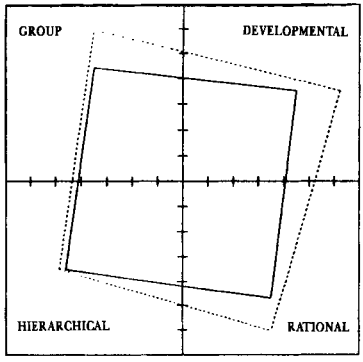
Factor	Eigenvalue	% of Variance
Factor 1 (developmental)	6.78	28.3
Factor 2 (hierarchical)	3.79	15.8
Factor 3 (rational)	1.49	6.2
Factor 4 (group)	1.01	4.2
	cumulative %	54.5

The total sample reveals that the organization presently emphasizes a relatively balanced set of values across all four cultures (see Table 2). The mean differences between the two configurations indicate the desire for flexibility, a greater focus on the external environment, and a marginal increase of control.

TABLE 2.
NOW AND SHOULD PROFILES BY TOTAL SAMPLE (IN ACTUAL SCORES)

	Now	*Should*	*Difference*
Group Culture	4.42	5.95	1.53
Developmental Culture	4.49	6.22	1.73
Hierarchical Culture	4.60	4.85	.25
Rational Culture	4.71	6.05	1.34

Scale: Minimally Valued 1 - 7 Extensively Valued



To further examine the similarities among the four culture scales, hierarchical clustering was used. Using the Ward method, hierarchical clusters of mutually exclusive groups were formed on the basis of similar standardized means for the four culture scales (Ward, 1963). This method reduces mutually exclusive groups by estimating the union of possible pairs and clustering the groups according to an established value. Four distinct cultures emerged. A series of ANOVA analyses confirmed the differences among the four profiles.

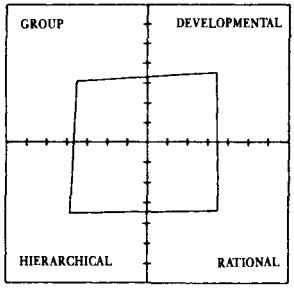
Profile 1, 2, and 4 display relatively balanced cultures without the dominance of a specific culture type (see Table 3). However, across all four cultures, profile 1 scores are considerably below the mean in all four cultures; profile 2 scores are at or near the sample mean; and profile 4 scores are substantially above the mean in the four

TABLE 3.
ONE-WAY ANOVA OF CLUSTERS ACROSS FOUR CULTURES IN ACTUAL AND Z-SCORES

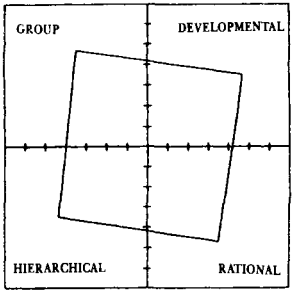
Culture Cluster	*Group Culture*	*Developmental Culture*	*Hierarchical Culture*	*Rational Culture*
#1 Weak Comprehensive	3.09 (-1.39)	3.44 (-1.04)	3.83 (-0.80)	3.38 (-1.42)
#2 Comprehensive	4.69 (0.28)	4.71 (0.22)	4.35 (-0.26)	4.70 (-0.00)
#3 H-R Culture	3.56 (-0.90)	3.43 (-1.05)	5.76 (1.20)	5.06 (0.39)
#4 Strong Comprehensive	5.37 (0.99)	5.58 (1.07)	5.51 (0.95)	5.81 (1.19)
F-ratio	87.024	62.901	52.468	70.328
p-level	.000	.000	.000	.000

Scale: Minimally Valued 1 - 7 Extensively Valued

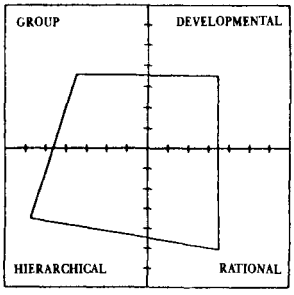
#1 Weak Comprehensive



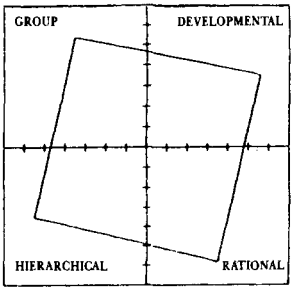
#2 Comprehensive



#3 H-R Culture



#4 Strong Comprehensive



quadrants. The "weak comprehensive" culture of profile 1 represents 15 percent of the sample; profile 2, the "comprehensive" culture, 60 percent; and the "strong comprehensive" culture of profile 4, 13 percent of the sample. Profile 3 displays an imbalanced culture dominated by the hierarchical and rational cultures with a disregard for the developmental and group cultures. This "H-R Culture" represents 12 percent of the sample.

Cross-tabulations of the clusters by sample characteristics further describe their composition. Proportionate to their size, the eight functional specialties (as well as the age, gender, and corporate location categories) are equally distributed across the clusters. However, management level and operational group categories moderately distinguish the groupings. As the row-tabulated section of Table 4 indicates, middle managers dominate the four clusters; however, they also comprise 69 percent of the total sample. Examining the column-tabulated section reveals that profile 2 includes the majority of managers from within each category, however, this cluster also represents 60 percent of the sample. The functional specialists describe the culture only in terms of profiles 1 and 2, leaving profile 3 membership to supervisors and middle managers and profile 4 to the remaining management levels. As the significance level indicates, management level moderately distinguishes the clusters.

Cross-tabulations by the operational group categories significantly differentiate the clusters. Although the highly populated "comprehensive" culture includes the largest percentage of managers from each group, the remaining population is unevenly distributed among the other cultures. Powertrain managers constitute 41.4 percent of the "weak comprehensive" culture, and the chassis group dominates the "H-R Culture" (64 percent). The two largest operational categories of manufacturers contain a definite percentage of defectors from the "comprehensive" culture. In contrast, the remaining portion of managers from the nonmanufacturing groups of corporate services, marketing, and logistics categories is more heavily concentrated in the "strong comprehensive" culture than in the "weak comprehensive" culture. Apparently, manufacturers are particularly dissatisfied with the present milieu. During the interview phase, many managers discussed the shift in corporate focus from manufacturing to marketing which angers a sizable portion of engineers, designers, and plant personnel.

ANOVA analyses of difference scores within clusters across the four cultures reveal that the level of balance for each of the "now" profiles indicates the corresponding degree of growth reflected in the "should" profiles. However, managers within all clusters want a slight change in the hierarchical culture. The highly dissatisfied

TABLE 4.
CROSS-TABULATIONS OF CLUSTERS BY MANAGEMENT LEVEL CATEGORIES

Culture Cluster	*Functional Specialist*	*Supervisory*	*Middle Management*	*Executive Council*	*Row Total*
#1 Weak Comprehensive	.069	.103	.793	.034	1.000
#2 Comprehensive	.016	.281	.656	.047	1.000
#3 H-R Culture	.000	.080	.920	.000	1.000
#4 Strong Comprehensive	.000	.322	.607	.071	1.000

Culture Cluster	*Functional Specialist*	*Supervisory*	*Middle Management*	*Executive Council*
#1 Weak Comprehensive	.50	.06	.156	.111
#2 Comprehensive	.50	.72	.571	.666
#3 H-R Culture	.00	.04	.156	.000
#4 Strong Comprehensive	.00	.18	.117	.222
Column Total	1.00	1.00	1.000	.999

$X^2 = 16.01546$,9 d.f., $p = .0666$

segment within the "weak comprehensive" profiles wants substantial growth across all cultures. The "H-R Culture" profiles represent the flexibility seekers who desire considerable change in the group and developmental cultures; they also want moderate growth in the rational culture as well as a definite decrease in the hierarchical culture. Although the managers within the "comprehensive" and "strong comprehensive" profiles are apparently satisfied, they desire a moderate change in the hierarchical culture, together with growth in the other cultures.

In summary, the profile from the total sample represents a relatively balanced set of values across all four cultures; however, managers want greater emphasis in the future on the values embodied in all but the hierarchical culture. Therefore, the difference scores

indicate the desire for flexibility, a greater focus on the external environment, and a marginal increase of control. Furthermore, hierarchical clustering of similarities among the four culture scales identified four distinct clusters. Three profiles reflect a balanced set of values: one culture at the level of the sample mean, another considerably below the mean in all four cultures, and the third substantially above the mean in the four quadrants. The fourth profile displays an imbalanced culture that de-emphasizes the developmental and group culture. As the significance levels indicate, management-level categories moderately distinguish the clusters. However, the operational group categories suggest that manufacturers are particularly dissatisfied with the present environment. ANOVA analyses of difference scores within clusters across the four cultures further reveal that the level of balance for each of the "now" profiles indicates the corresponding degree of growth reflected in the "should" profiles.

Summary

The descriptive statistics reveal that managers scan a few times per year and use oral sources more often than other media to access external information. The smallest percentage of the sample comprises the most frequent scanners (i.e., senior male executive marketers and engineers). Furthermore, the total sample feels that the firm practices a relatively balanced set of values across all four cultures. However, in the future, managers want an increased emphasis on the values that are embodied in all but the hierarchical culture. Clustering identified four culture profiles that describe the firm at different levels of comprehensiveness and as overemphasizing the control-focused hierarchical and rational cultures. Sample characteristics reveal that chassis products and powertrain managers are particularly dissatisfied with the present environment.

Relationships Between Scanning and Culture

Recall that culture profiles 1, 2, and 4 display relatively balanced cultures without the dominance of a specific culture type. However, across all four cultures, profile 1 scores of the "weak comprehensive" culture are low; the scores for the "comprehensive" culture are at or near the sample mean; and profile 4 scores of the "strong comprehensive" culture are high. The "H-R Culture" of profile 3 displays an imbalanced culture dominated by the hierarchical and rational cultures with a disregard for the developmental and group cultures. Also recall that the total sample mean for scanning frequency is 2.21 on a five-point scale with 75 percent of the population at or below the scale mean of 2.50.

To examine the relationship among these four cultures and scanning frequency, one-way ANOVA analyses of culture and scanning

frequency by source types were conducted. As Table 5 shows, managers within the "comprehensive" and "strong comprehensive" cultures report relatively higher frequency means than the dissatisfied

TABLE 5.
SERIES OF ONE-WAY ANOVA ANALYSES OF CULTURE AND SCANNING FREQUENCY BY SOURCE TYPES

Source Type	*#1 Weak Comprehensive*	*#2 Comprehensive*	*#3 H-R Culture*	*#4 Strong Comprehensive*	*F-ratio p-level*
Subscriptions	2.61	2.72	2.96	3.02	2.074 .105
Photocopied Articles	2.28	2.31	2.32	2.53	.802 .494
Books, Etc.	1.58	1.67	1.47	1.68	.868 .459
Written Materials	1.73	1.88	1.69	2.12	2.367 .072
Other Written Material	1.78	1.97	1.76	2.17	1.988 .117
Conv. Consultants	1.54	1.62	1.49	1.52	.442 .723
Conv. Outsiders	2.02	2.40	2.18	2.68	3.450 .017
Conv. Superiors	2.87	3.08	3.12	3.06	.564 .639
Conv. Subordinates	2.84	3.18	3.00	3.34	1.457 .227
Conv. Peers	3.02	3.17	3.40	3.26	.852 .467
Comm. Info. Services	1.63	1.71	1.58	1.94	.875 .455
Training & Development	1.32	1.56	1.39	1.71	2.639 .051
Audio/Visual	1.32	1.51	1.34	1.52	1.544 .204

managers within the other two cultures. In the "conversation with outsiders" source-type category of Table 5, the relationships are significant at the .017 level. Furthermore, across the categories in this table, managers within the "strong comprehensive" culture are

the most frequent scanners within the total sample. Although these analyses do not yield statistically significant findings, they strongly suggest that the differences in the comprehensiveness of culture profiles relate to scanning frequency.

Exploring these relationships further, a regression equation was constructed to examine the relative effects of various predictors on scanning frequency. Despite the possibility of multicolinearity, factors that emerged as significant in previous analyses were included in these models. The functional specialty categories and culture profiles which significantly correlated with scanning frequency were included in the first equation (see Table 6). The overall equation as well as

TABLE 6.
REGRESSION COEFFICIENTS FOR SCANNING FREQUENCY

Predictor Variables	*beta weight*	*p-level*
Information Variables	-.1702	.0862
Comprehensive Culture Profile	.1440	.1336
General Management	.1192	.1938
Finance	.0235	.8036
Marketing/Sales	.1996	.0524
Engineering	-.0637	.5295
Distribution & Logistics	-.1853	.0792
H-R Culture Profile	.0330	.6969
Strong Comprehensive Culture Profile	.1902	.0289
Manufacturing	.1405	.2220
F-ratio	4.4870	.0000
Adjusted R square	.1470	

some predictors are significant. The positive beta weights for the strong comprehensive profile and the marketing category, as well as negative weights for the information systems and distribution categories, indicate the importance of these factors in comparison with the other variables in this analysis for predicting scanning frequency. These results confirm previous analyses as well as suggested relationships which indicate that membership within the strong

comprehensive culture affects scanning. This analysis also demonstrates the importance of function in relationship to source use; specifically, the marketing function encourages scanning while the internally focused systems and distribution operations inhibit scanning.

In summary, the results from correlation analyses suggest that a balanced culture positively influences scanning frequency. Specifically, imbalanced cultures sustain rational managers who rarely scan, while balanced cultures develop adaptive managers who frequently scan. The regression analyses suggest the importance of function and culture membership for determining scanning frequency within this population.

Interpretations and Implications

Within the setting for this study, executives are incorporating a global distribution function into an established multinational manufacturing firm. As a manufacturer, management often relied on the precise calculations of analysts and engineers. However, as a multinational distributor, management must respond to shifting market conditions. This transformation requires learning and growth. However, after foreign competitors invaded the industry, parameters changed, but perceptions in the firm did not. Management sought to absorb the turbulence through a strategy of acquisition and differentiation which eventually eroded the firm's fine-tuned financial foundation. Rather than develop its manufacturing expertise, management chose to exploit the firm's distribution capabilities. To accomplish this corporate lobotomy, management divested the firm of numerous acquisitions and terminated many employees. Although granting short-term financial stability, this operation not only divided the corporation between manufacturers and distributors but also removed considerable expertise from the corporate memory. Within this atmosphere, executives delegate responsibilities and decision making; managers often respond with mistrust and fear because they perceive such gestures as efforts to promote compliance rather than flexibility. Administrators attempt to mastermind this transformation by touting a strategy of growth, yet they sustain an environment that reinforces obsolete perceptual frameworks and perpetuates debilitative behavior.

The data on scanning frequency indicate that upper management makes decisions and middle management performs tasks. The low sample mean, the relative similarities of scores, as well as the small number of frequent scanners provide evidence that the sample population, particularly middle management, focuses inward. Regardless of function or position, the most frequently used sources

are conversations with employees or outsiders with whom managers relate in conjunction with their job (e.g., marketers speak with salespeople, engineers with manufacturers, production managers with suppliers). As interviewees revealed, a lack of cash flow and time prohibits managers from scanning. Those who come upon external information may route it to decision makers through the firm's ill-defined communication channels, sequester it to revenge the reestablished order, or share it to gain respect, particularly from among the newly appointed members of upper management. Although, to retain the corporate locus of control, leaders often intimidate, isolate, and terminate informers.

In addition, the findings regarding the most frequent scanners locate the external focus of the corporation within upper management. Unlike lower levels, these managers supplement their frequent use of oral sources with other media. As interviewees revealed, senior members, who desire key positions within the new coalition, eliminate contradictory information rather than risk repudiation or dismissal. Therefore, irrespective of position or job title, the information-processing framework comprises functional and political factors which can explain the infrequent scanning pattern and ultimately inhibit organizational growth.

The cultural profiles graphically portray the dimensions of these contextual factors as well as provide evidence of their importance in effecting scanning frequency. The comprehensive profile which comprises 60 percent of the population not only represents the sample mean, but, more importantly, the behavioral and perceptual norm. Within this culture, managers, who infrequently scan or challenge policies or procedures, are supported; those who act differently are punished. The strong comprehensive profile comprises the most frequent scanners and open-minded managers within the sample. In addition, a major product group constitutes the majority of this culture. This production unit experiments with relatively innovative management techniques to increase teamwork and responsiveness to internal and external fluctuations. The subsequent optimistic perspective encourages a higher degree of scanning, interaction, and responsibility. In contrast, the most infrequent scanners and closed-minded managers within the sample constitute the weak comprehensive and H-R cultures, both of which are dominated by a second major product group. This product division stresses traditional task-specific behavior to sustain its product line. These irresponsive and bureaucratic cultures support unassertive and compliant attitudes as well as scarce scanning behavior. The normative and dissatisfied cultures prohibit responsiveness. The resultant overly cautious perspective jeopardizes the espoused strategy, which frustrates upper

management, who retaliate through intimidation. The responsive defectors within the adaptive culture attempt to break this counterproductive cycle. However, the leaders, who remain buffered within their traditional perspective, view them with suspicion and offer only nominal support.

This corporation permits its triumphs to destroy its future. Personnel cannot scan or engage in other responsive and responsible behaviors because leaders prevent managers from developing an interpretive framework to counteract the negative consequences fostered by the traditional perspective. Regardless of the innovativeness of the technologies or strategies, until they confront these cultural and perceptual issues, leaders impede their own attempts to transform the company.

Future Research

One cannot generalize from the results of this study because of the nature of the case study approach. Additional studies of managers within the same industry would provide a broader sample to allow interorganizational comparisons. A larger sample may also yield greater variations in the data and, in turn, more significant results. However, as a caveat, these studies must include managers who would, in fact, use external information in conjunction with their job. Second, studies which include relatively large samples of managers within different industries may also provide a basis for comparing firms within product and services sectors. Different levels of perceived environmental uncertainty may also be examined in relationship to usage as well as culture. In addition, provided the sample is sufficiently large, the impact of organizational culture on profitability measured by return on equity may be considered.

APPENDIX A

A Proposed Study of Individual and Corporate Responsiveness to Business & Economic Conditions

WHAT: This proposed study will complement [redacted] reorganization efforts by identifying strengths, blindspots, and obstacles which influence how decision makers and managers monitor and respond to business conditions.

WHY: Research indicates that open-minded managers and responsive corporate cultures:

* increase corporate productivity and profitability
* use many sources of information for environmental analysis
* effectively respond to environmental changes
* promote the flow of critical information to decision makers

DELIVERABLES: The final report will present both a general and detailed analysis by site and functional area of the following factors at [redacted] which affect environmental scanning and corporate responsiveness.

* Specific strengths and barriers include:
  - —adequacy of resources for information access
  - —usefulness of acquired information for decision making
  - —extent of purposive distortion of information
  - —emphasis on routines and procedures
  - —willingness to consider creative strategies
  - —adequacy of critical thinking and analytical skills
  - —support for critical evaluation of present procedures
  - —support for development of innovative strategies

* the extent to which oral, written, and electronic sources of information are used by decision makers for environmental scanning; and

* ranking of decision makers on the continuum between open and closed mindedness

HOW:

* 45-minute interviews with 35-50 upper-level managers from major functional area at various sites will identify key factors for inclusion in a 15-minute survey to be completed by 250-300 managers.
* executive support and encouragement of managers to respond honestly and candidly to interview and survey questions

APPENDIX B

Information Culture Survey

INTRODUCTION

This questionnaire, which is being distributed to 200 managers throughout [ ], should take approximately 20 minutes to complete. There are no right or wrong answers. Your responses will be used as part of a study at The University of Michigan, where the data will be analyzed. Your responses will remain **strictly confidential. Your identity will NOT be revealed by your responses.** The data will NOT be analyzed in a manner in which any individual's views can be detected. Responses will be compiled with those from the other participating managers. The final report will offer managers *practical* recommendations on how to help [ ] growth efforts.

You are asked to describe:

1) How you gather information about what is happening *outside* the firm and
2) How certain values may be evident at [ ] .

The events occurring outside [ ] usually concern one or more of the following areas: CUSTOMERS, COMPETITORS, SUPPLIERS, ECONOMIC CONDITIONS, TECHNOLOGICAL ISSUES, and/or REGULATORY CHANGES. Most managers will naturally focus on certain areas more than others because of their functional specialty. Some events though, such as the recent reduction in sales of automobiles, fall into more than one area. Consequently, managers in many departments will gather information about these events. Therefore, you are asked to describe how often *you use* certain sources of information to monitor events in the six areas stated above which may affect your functional specialty and your responsibilities.

As with any firm, values dictate how things are done around [ ], specifically, how information is gathered about external events. Therefore, you are asked to describe the extent to which *you see* certain values operating in your area of the firm.

Please complete *all questions in each section* and return the survey to The University of Michigan in the attached envelope. Do not return this survey to anyone in [ ] . Do not discuss the contents of this survey with others as this may influence their response. Thank you for your cooperation.

PLEASE COMPLETE THIS SURVEY UPON *RECEIPT*

continue on *reverse* side

EXTERNAL INFORMATION SECTION

How often do you seek and/or receive USEFUL information about what is happening *outside the corporation* in the following areas: **CUSTOMERS, COMPETITORS, SUPPLIERS, ECONOMIC CONDITIONS, TECHNOLOGICAL ISSUES,** and **REGULATORY CHANGES? USEFUL** information means that it helps you understand what's happening OUTSIDE THE FIRM. Do NOT consider information that you merely skim and throw away or that you disregard.

****NOTE:** PLEASE review the following list of information sources BEFORE completing the grid on the next page.

A. PERSONAL SUBSCRIPTIONS delivered to your home OR office (newspapers, magazines, professional journals)

B. PHOTOCOPIED ARTICLES RECEIVED from other employees

C. BOOKS, GOVERNMENT PUBLICATIONS, MARKET STUDIES

D. WRITTEN MATERIAL *PRODUCED BY* OTHER ORGANIZATIONS/FIRMS
(annual/quarterly reports, production schedules, product catalogs, design specifications)

E. OTHER WRITTEN MATERIALS, including correspondence **ABOUT** other firms, organizations, associations

F. CONVERSATIONS WITH CONSULTANTS (financial, legal, & governmental representatives; friends in OTHER firms)

G. CONVERSATIONS WITH OTHER OUTSIDERS, **including customers, competitors, suppliers** and attendees of conference and/or trade shows.

H. CONVERSATIONS WITH SUPERIORS in [_____], including formal and informal meetings

I. CONVERSATIONS WITH SUBORDINATES in [_____], including formal and informal meetings.

J. CONVERSATIONS WITH PEERS in [_____], including formal & informal meetings

K. COMMERCIAL INFORMATION SERVICES (Dow-Jones, Dunn and Bradsreet, LEXIS, DIALOG)

L. TRAINING & DEVELOPMENT (in-house educational exercises, simulations, case studies, computer-based training)

M. AUDIO/VISUALS (video programs, audio cassette tape, film)

Please refer to these descriptions while completing the grid

CULTURAL SECTION #1

Please describe the values operating or practiced in your *work unit.* Using the following scale, please indicate, in the FIRST column, the extent to which each item is NOW valued and, in the SECOND column, the extent to which you feel each item **SHOULD BE** valued.

MINIMALLY VALUED 1 2 3 4 5 6 7 EXTENSIVELY VALUED

NOW VALUED	SHOULD BE VALUED	
1. _____	33. _____	Control, centralization
2. _____	34. _____	Openness to change, adaptability
3. _____	35. _____	Empowerment of employees to act
4. _____	36. _____	Task focus, accomplishment, achievement
5. _____	37. _____	Predictable performance outcomes
6. _____	38. _____	Revitalization, new vision
7. _____	39. _____	Participation, open discussion
8. _____	40. _____	Productivity, profitability
9. _____	41. _____	Rule compliance
10. _____	42. _____	Courage, risk taking, freedom to fail
11. _____	43. _____	Intense pursuit of work objectives
12. _____	44. _____	Developing human resources
13. _____	45. _____	Creative thinking, new ideas
14. _____	46. _____	Routinization, formalization, structure
15. _____	47. _____	Direction, objective setting, goal clarity
16. _____	48. _____	Assessing employee concerns and ideas
17. _____	49. _____	Clarification of mission, values, purpose
18. _____	50. _____	Human relations, teamwork, cohesion
19. _____	51. _____	Stability, continuity, order
20. _____	52. _____	Innovation
21. _____	53. _____	Maintaining social & technical systems
22. _____	54. _____	Decisiveness, making things happen
23. _____	55. _____	Safe, orderly working conditions
24. _____	56. _____	Responsiveness to internal and external customers
25. _____	57. _____	Personal responsibility for decisions
26. _____	58. _____	Excellence and quality
27. _____	59. _____	Reduction of time in all processes
28. _____	60. _____	Faith in corporate direction
29. _____	61. _____	Individual and team accountability
30. _____	62. _____	Personal integrity
31. _____	63. _____	Work should be fun
32.*		

*32 was inadvertantly omitted in the original survey.

PERSONAL INFORMATION

PLEASE CHECK THE APPROPRIATE LINE IN EACH SECTION

FUNCTIONAL SPECIALTY

_____ Finance/Accounting
_____ Human Resources/Personnel
_____ Manufacturing/Production
_____ Marketing/Sales
_____ Distribution
_____ Engineering/Research
_____ General Management
_____ Information Systems/Data Processing
_____ Other (please specify)

CORPORATE LOCATION

_____ [A]

_____ [B]

OPERATIONAL GROUP

_____ Corporate Services
_____ Chassis Products
_____ Powertrain
_____ Aftermarket Sales and Marketing
_____ Distribution and Logistics

SEX

_____ Male _____ Female

AGE

_____ Under 30
_____ 30-39
_____ 40-49
_____ 50-99

MANAGEMENT LEVEL

_____ Functional Specialist
_____ Supervisory
_____ Middle Management
_____ Executive Council

Please complete **all questions in each section** and return the survey to The University of Michigan in the attached envelope. Do not return the surveys to anyone in [ ]. Do not discuss the contents of the survey with others as this may influence their response. Thank you for your cooperation.

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CEOs, Information, and Decision Making: Scanning the Environment for Strategic Advantage

ETHEL AUSTER AND CHUN WEI CHOO

ABSTRACT

CEOs SCAN THE EXTERNAL ENVIRONMENT for information about events and trends in order to plan their organizations' future courses of action. This study investigates how CEOs in the Canadian publishing and telecommunications industries acquire and use information about the business environment. The uncertainty of the environment was found to be related to the amount of scanning done. The perceived quality of information sources and the environmental uncertainty accounted for a significant proportion of the variance in source use. Information about the environment was often used in making decisions concerning organizational improvements and business strategies.

INTRODUCTION

The work of managers is information intensive. Managers are exposed to a huge amount of information from a wide range of sources and selectively use the information to make day-to-day decisions and to formulate longer term strategies. Yet much remains to be learned about the information behavior of managers as a distinct user group. Relative to the large number of studies on scientists and technologists, there have been only a very few studies that look at managers of business organizations as information users. Should we expect managers to show the same preferences for information sources as scientists and engineers? Are there special features about managers

Ethel Auster, Faculty of Information Studies, University of Toronto, 140 St. George Street, Toronto, Ontario, Canada M5S 1A1
Chun Wei Choo, Faculty of Information Studies, University of Toronto, 140 St. George Street, Toronto, Ontario, Canada M5S 1A1
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scanning for information about an uncertain environment that would influence their use of sources? Organization theory emphasizes the effect of environmental uncertainty on scanning behavior and the use of environmental information to develop courses of action. To what extent does environmental uncertainty affect the use of information sources? How do managers use information about the environment in decision making? The purpose of the present study is to investigate how chief executive officers (CEOs) in the Canadian publishing and telecommunications industries seek and use information about the external business environment, an activity known as environmental scanning.

Environmental scanning is defined as the acquisition and use of information about events and trends in an organization's external environment, the knowledge of which would assist management in planning the organization's future courses of action (Aguilar, 1967; Choo & Auster, 1993). Following Aguilar, we recognize that scanning includes both general viewing of, or exposure to, information, and purposeful searching for information to address particular issues. Furthermore, we recognize that scanning is needed to provide the information for top management to make decisions that create strategic advantage for the organization to succeed in a changing environment (Glueck & Jauch, 1984; Lester & Waters, 1989).

Conceptual Framework

Research on environmental scanning appeared in the 1960s with a pair of pioneering studies by Aguilar (1967) and Keegan (1968). Since then the majority of studies has revolved around four research themes: (1) the effect of perceived environmental uncertainty on scanning; (2) environmental sectors scanned; (3) information sources used; and (4) scanning methods. On the effect of environmental uncertainty, most studies found that managers who perceive greater environmental uncertainty tend to do more scanning (see for example, Nishi et al., 1982; Daft et al., 1988; Auster & Choo, 1992, 1993). The focus of scanning is on market-related environmental sectors, with information about customers, competitors, and suppliers being the most important (Jain, 1984; Ghoshal & Kim, 1986; Lester & Waters, 1989). The information sources most often used are personal sources, especially managers and staff within the organization, while sources such as the company library and online databases were less used (O'Connell & Zimmerman, 1979; Kobrin et al., 1980; Auster & Choo, 1992, 1993). Scanning methods can range from ad hoc informal activities to systematic formalized efforts, depending on the organization's size, its experience, and its perception of the environment (Thomas, 1980; Klein & Linneman, 1984; Preble et al.,

1988) (for an in-depth review of research on environmental scanning, see Choo & Auster, 1993).

Taylor (1991) suggests that a more complete picture of information seeking by a group of users may be gained by analyzing their information use environment, which comprises sets of people, dimensions of the problems to be solved, the work setting, and the ways problems are considered to be resolved. The present study attempts to understand something of the managers' perceptions of their business environments that would reflect the problem dimensions (e.g., complexity, familiarity) which motivate their information seeking, the scanning activity itself, and the ways that they then use the information in problem solving or decision making.

The conceptual framework for investigating these research questions is constructed on theoretical foundations in organization theory and information needs and uses studies. A recent review of past research on scanning concluded that the perceived uncertainty of the environment is related to the amount of scanning done (Choo & Auster, 1993). Uncertainty arises because the executive experiences a lack of information about an external environment that is complex and variable. Furthermore, the more important or strategic that environmental change is perceived to be, the greater the amount of scanning. Thus we identify perceived strategic uncertainty as an independent variable that would affect the executives' scanning behaviors. Information seeking involves both selection and use of sources. Several classic information needs and uses studies have found that users prefer sources that are perceived to be more accessible rather than sources that are perceived to be of higher quality (see, for example, Rosenberg, 1967; Gertsberger & Allen, 1968; Allen, 1977). Some recent studies have examined how the perceived quality of information from a source may influence its use (Halpern & Nilan, 1988; Nilan et al., 1988; Taylor, 1986; Zmud, 1978). Although it is possible to think of other organizational and personal variables that could affect scanning, concentrating on environmental uncertainty, source accessibility, and source quality, provides a useful start in identifying key informational variables that influence the amount of scanning and the use of information sources to do the scanning. Finally, in order to complete our model, we explore how managers use the scanned information in decision making (Mintzberg, 1973, pp. 137-42). The full conceptual framework is shown in Figure 1.

To summarize, the present study investigates environmental scanning by chief executive officers in two Canadian industries by addressing three research questions:

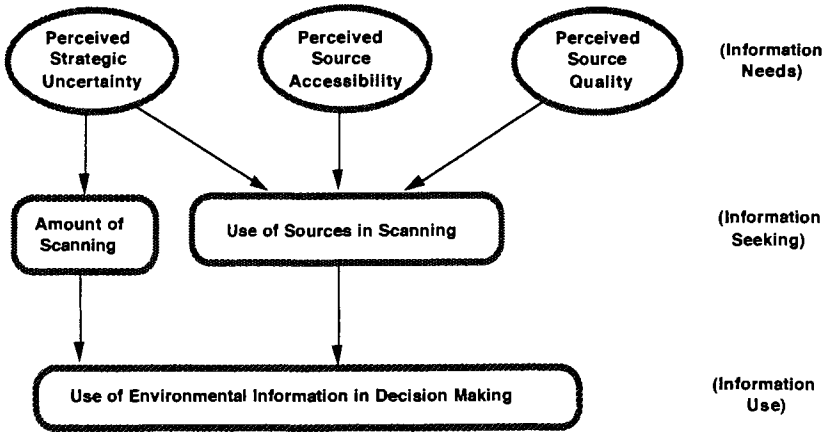


Figure 1. Model of environmental scanning based on environmental uncertainty, source accessibility and quality

1. Is perceived environmental uncertainty related to the amount of scanning?
2. Do source characteristics and environmental uncertainty affect the use of information sources in environmental scanning?
3. How is environmental information used by the executives in decision making?

Procedures

Study Population and Data Collection

The study population consists of CEOs in the Canadian publishing and telecommunications industries. Both industries are vital to the Canadian economy and thrive in dynamic business environments in which the forces of change include increased competition, technological progress, new business structures, population growth, and shifting social preferences. Seven industry groups were defined based on U.S. Standard Industrial Classification Codes. Using these codes, online searches were done in the Canadian Dun's Market Identifiers database and the Cancorp Canadian Corporations database. Companies with annual revenues equal to or greater than C $5 million were selected. This procedure yielded a total of 207 CEOs—94 in publishing and 113 in telecommunications. Data were collected by a mail questionnaire that was sent to every one of the executives identified. From the population of 207 CEOs, 115 returned questionnaires, giving a response rate of 56 percent. Respondents were asked if they were willing to be interviewed. Interviews were

then requested with the twenty-two respondents in the province of Ontario who agreed to be interviewed. The decision to interview in Ontario is based on geographical proximity and on the fact that a large percentage of firms in both industries is located in the province. Eventually, thirteen respondents were interviewed (most of the others were out of town during the three-month interviewing period). Using the critical incident technique (Flanagan, 1954), interview respondents were asked to recall their experiences and behaviors in two specific incidents of acquiring and using environmental information.

Environmental Sectors

The external business environment of a firm is divided into six environmental sectors as defined by Daft et al. (1988) in their study of CEO scanning:

1. Customer sector "refers to those companies or individuals that purchase the products made by your company... [and] include[s] companies that acquire your products for resale as well as final customers."
2. Competition sector includes the companies, products, and competitive tactics—companies that make substitute products; products that compete with the respondent firm's products; and competitive actions between the respondent's firm and other companies in the same industry.
3. Technological sector "includes the development of new production techniques and methods, innovation in materials and products, and general trends in research and science relevant to your company."
4. Regulatory sector "includes federal and [provincial] legislation and regulations, city or community policies, and political developments at all levels of government."
5. Economic sector "includes economic factors such as stock markets, rate of inflation, foreign trade balance, federal and [provincial] budgets, interest rates, unemployment, and economic growth rate."
6. Sociocultural sector "comprises social values in the general population, the work ethic, and demographic trends such as the increasing number of women in the work force" (pp. 137-38).

Environmental Uncertainty

The measurement of perceived environmental uncertainty is based on Duncan's (1972) model. Duncan identifies two dimensions of the environment: (1) the simple-complex dimension is the number of environmental factors taken into consideration in decision making;

and (2) the static-dynamic dimension is the degree to which these factors remain the same or change continually over time (pp. 314-17). Decision makers in environments which are complex and dynamic experience the greatest amount of perceived environmental uncertainty (p. 325). Daft et al. (1988) and Boyd (1989) found that the perceived importance of trends and events in the various environmental sectors has a major effect on scanning activity. Uncertainty and importance were merged in a measure called "perceived strategic uncertainty" (PSU), defined as a combination of uncertainty measured by the complexity and variability of an environmental sector, and the importance to the firm of events in that sector. In the questionnaire, respondents assessed each of the six environmental sectors according to three questions on the relative importance, rate of change, and level of complexity of each sector.

Information Sources

Sixteen information sources are selected for the questionnaire based on sources studied in past research on environmental scanning, notably in Aguilar (1967), Keegan (1974), Culnan (1983), Preble et al. (1988), and Daft et al., (1988). The sixteen sources are: customers; competitors; business and professional associates (including other executives, bankers, lawyers, financial analysts, and consultants); government officials; newspapers and periodicals; government publications; broadcast media (radio and television); industry and trade associations (publications and reports); conferences and trips; superiors and board members; subordinate managers; subordinate staff; internal memoranda and circulars; internal reports and studies; company library; and electronic information services that include news wire services and online databases.

Perceived Source Accessibility

Based upon the theoretical and empirical work of Allen (1977), Culnan (1983), and O'Reilly (1982), perceived source accessibility is operationalized as the amount of effort needed to locate a source and then to get the needed information from that source. Two questions in the questionnaire measure the perceived accessibility of each source:

1. How much of your time and effort is needed to approach, contact, or locate each information source?
2. After contacting or locating the source, how easy is it to get the desired information from that source?

For each of the sixteen sources, respondents indicated their answers to these questions on a five-point ascending scale. Each point on the scale is defined with a short description. The response scores

from these two questions are summed into an index of the perceived accessibility of each source.

Perceived Source Quality

Based upon the theoretical definitions of Saracevic (1975), Zmud (1978), Taylor (1986), and the empirical findings of O'Reilly (1982), Nilan et al. (1988), and Halpern and Nilan (1988), perceived source quality is operationalized as the perceived relevance and reliability of the information provided by the source. Two questions in the questionnaire measured the perceived quality of each source: (1) How relevant is the information from each source about the environment? (relevant information is defined as information that is needed and useful with respect to the goals and activities of the respondent's firm), and (2) How reliable is the information from each source about the environment? (information is reliable when it is authoritative and dependable. It is information that you personally trust). For each of the sixteen sources, respondents indicated their responses to these questions on a five-point ascending scale. Each point on the scale is defined with a short description. The response scores from these two questions are summed into an index of the perceived quality of each source.

Amount of Scanning

Applying a method developed by Hambrick (1979) and subsequently validated by Farh et al. (1984), two questions in the questionnaire measured the amount of scanning: (1) To what extent do you keep yourself informed about developments in each environmental sector? and (2) How frequently does information about each environmental sector come to your attention? Hambrick believed that each question touches upon a different aspect of scanning. Thus, the level of interest (question 1) would be affected by the executive's cognitive traits and value system, while the frequency with which information comes to the executive's attention (question 2) would be related to other factors such as the kind of information channels in the industry and the executive's scanning style.

Source Use

The second dependent variable is the frequency with which each information source is used in environmental scanning. In the questionnaire, each respondent is asked to indicate how frequently he or she uses each of the sixteen sources to scan the environment. The response is indicated on a descending scale with six categories: "At least once a day," "At least once a week," "At least once a month," "Few times a year," "Less than once a year," and "Never."

Information Use

The use of environmental information in decision making was analyzed using the data collected from personal interviews. Each critical incident of information use related by the respondent was categorized according to Mintzberg's (1973, pp. 77-94) model of decisional roles. According to Mintzberg, access to information and positional authority empowers the manager to perform four decisional roles. As *entrepreneur,* the manager initiates "improvement projects" such as new lines of business or joint ventures that exploit an opportunity or solve a problem. As *resource allocator,* the manager controls the distribution of all forms of organizational resources through, for example, budget allocations and the setting of targets. As *disturbance handler,* the manager deals with unexpected but important events. Finally, as *negotiator,* the manager engages in major negotiations with other organizations or individuals.

Findings

Profile of Respondent CEOs and Firms

Of the 207 CEOs in the study population, 115 CEOs returned completed questionnaires (56 percent). Sixty-seven of the respondents are CEOs of telecommunications companies (60 percent), with the remaining forty-eight being CEOs of publishing firms (51 percent). The 115 firms have a combined annual turnover of over C $18 billion and employ a total of over 132,000 people. The smallest firms had an annual sale of C $5 million, while the largest had sales of over C $7.3 billion and hire 50,000 staff. On the whole, the distribution of respondent firms by size is similar to that of the study population. Among the respondents, 43 percent fall in the age group 45-54, while another 28 percent are between 35 and 44. In terms of length of tenure as chief executive, the mean number of years as CEO is 6.5. The mean number of years with the firm is twelve. Before becoming CEO, over 49 percent of the respondents were in the marketing functional area with another 15 percent in production. As for educational background, nearly 42 percent have a Bachelor's degree, and another 26 percent have a Master's degree.

Environmental Uncertainy and Amount of Scanning

Respondents assessed each of the six environmental sectors according to its complexity, variability, and importance on a five-point ascending scale. The complexity and variability scores were summed and multiplied by the importance score to give an overall index of perceived strategic uncertainty. Table 1 shows the environmental sectors in order of descending mean perceived strategic uncertainty. The customer and technological sectors are perceived

TABLE 1.
PERCEPTION AND AMOUNT OF SCANNING OF ENVIRONMENTAL SECTORS

Environmental Sector	*Perceived Strategic Uncertainty*	*Frequency of Information about Sector Coming to Attention*		*Level of Interest in Keeping Informed about Sector*	
		Frequency	*Correlation*[1]	*Interest*	*Correlation*[1]
Customer	33.98	3.83	.32	4.17	.40
Technological	32.95	3.46	.38	3.45	.36
Competition	27.80	3.35	.30*	3.53	.44
Regulatory	27.64	3.25	.46	3.85	.46
Economic	25.81	2.70	.35	3.41	.42
Sociocultural	21.47	2.66	.42	2.76	.58

1: All Pearson's correlation coefficients are statistically significant, $p \leq .001$, except *: $p \leq .001$.

to be the most strategically uncertain, followed by the competition and regulatory sectors.

In terms of amount of scanning, respondents indicated that information about the customer, technological, and competition sectors came most frequently to their attention. Respondents were most interested in keeping themselves informed about the customer, regulatory, and competition sectors.

The amount of scanning is correlated with perceived strategic uncertainty (see Table 1). All correlation coefficients are positive and statistically significant ($p \leq .001$ with one exception at $p \leq .01$). Correlation coefficients between uncertainty and the frequency measure of scanning range from 0.30 to 0.46, with an average value of 0.37. Correlation coefficients between uncertainty and the interest measure of scanning range from 0.36 to 0.58 with an average of 0.44. These correlations are comparable to, but slightly lower than, those found by Daft et al. (1988) and Boyd (1989) using a similar measure of perceived strategic uncertainty.

Perception and Use of Information Sources

Table 2 shows the mean frequency with which the respondents use each source to scan the environment. A high numerical score indicates a high frequency of use (6 = > Once a day, 5 = > Once a week, 4 = > Once a month, 3 = > Few times a year, 2 = < Once a year, and 1 = Never.) Newspapers and periodicals are the most frequently used source followed by subordinate managers, subordinate staff, broadcast media, and internal memoranda and circulars. The respondents tap a broad array of sources, including internal and external sources, as well as personal and impersonal sources. As was

TABLE 2.
PERCEPTION AND USE OF INFORMATION SOURCES

Information Source	*Frequency of Use*	*Perceived Source Accessibility*	*Perceived Source Quality*
Newspapers, periodicals	5.32	7.71	7.00
Subordinate managers	5.05	7.83	8.62
Subordinate staff	4.78	7.92	8.07
Broadcast media	4.64	7.76	6.17
Internal memo, circulars	4.45	7.95	7.57
Customers	4.43	6.58	8.55
Business/professional associates	4.13	7.08	7.66
Internal reports, studies	4.04	7.74	7.98
Industry, trade associations	3.75	7.23	7.46
Superiors, board members	3.75	7.68	7.91
Competitors	3.68	5.74	7.11
Government publications	3.44	7.26	6.22
Company library	3.32	7.49	6.58
Conferences, trips	3.09	6.68	7.49
Government officials	3.03	6.20	6.56
Electronic information services	2.93	7.09	6.10

found in other scanning studies, personal sources are very important—the most frequently used personal sources are subordinate managers, subordinate staff, customers, and business associates. However, other personal sources like competitors and government officials are less used. The least frequently used sources are conferences/trips, government officials, and electronic information services.

In terms of accessibility, internal memoranda and circulars are perceived to be the most accessible source followed closely by subordinate staff and subordinate managers (see Table 2). The least accessible sources are competitors, government officials, and customers. Interestingly, the company library is ranked eighth among the sixteen sources, while electronic information services is ranked eleventh.

In terms of quality, subordinate managers and customers are perceived to provide information of the greatest relevance and reliability (see Table 2). The next best regarded sources are subordinate staff and internal reports and studies. Broadcast media and electronic information services have the lowest mean quality scores, implying that information they provide is seen to be less relevant and reliable.

Figure 2 plots the use of sources in relation to perceived accessibility and quality. Each circle represents a source: its size indicates approximately the use frequency, while its position indicates its perceived accessibility and quality. The number following the source

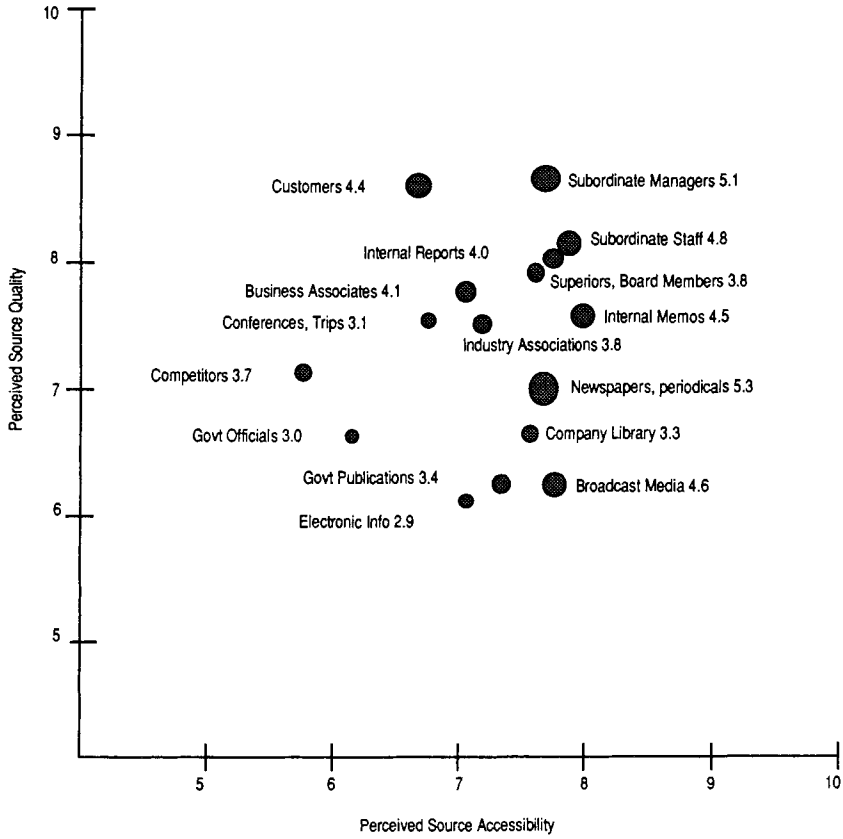


Figure 2. Perception and use of information sources

name is the mean use frequency of the source. The plot suggests that the frequency of source use is related to both perceived source accessibility and quality with perceived quality appearing to be a stronger factor.

Our conceptual model implies that both environmental uncertainty and source characteristics influence source use in scanning. To test this, regression models are computed for each source to compare the effects of environmental uncertainty, source accessibility, and source quality on source use. An overall measure of environmental uncertainty (perceived environmental uncertainty) is obtained by summing the perceived strategic uncertainty values over the six environmental sectors. The results are presented in Table 3. All sixteen equations are significant at $p \leq .001$. The adjusted

TABLE 3.
EXPLAINING FREQUENCY OF SOURCE USE USING REGRESSION MODELS OF PERCEIVED SOURCE ACCESSIBILITY AND QUALITY, AND PERCEIVED ENVIRONMENTAL UNCERTAINTY

	Variance Accounted For	*Contribution of Perceived Source Accessibility*[1]	*Contribution of Perceived Source Quality*[2]	*Contribution of Perceived Environmental Uncertainty*[3]
	Adj. R^2	*sR^2*	*sR^2*	*sR^2*
Customers	.18	.00	.16	.05
Competitors	.14	.00	.07	.09
Business/ professionals	.21	.02	.14	.07
Government officials	.33	.01	.28	.05
Newspapers/ periodicals	.13	.01	.09	.04
Government publications	.29	.00	.29	.02
Broadcast media	.15	.00	.17	.01
Industry, trade associations	.19	.02	.19	.01
Conferences, trips	.31	.00	.29	.04
Superiors, board members	.30	.00	.28	.03
Subordinate managers	.30	.01	.25	.02
Subordinate staff	.22	.00	.21	.03
Internal memo, circulars	.28	.00	.27	.02
Internal reports, studies	.24	.01	.18	.07
Company library	.28	.01	.29	.00
Electronic information	.48	.02	.47	.01

All models are statistically significant at $p \leq .001$.
Adj. R^2: Adjusted squared multiple correlation. sR^2: Squared semipartial correlation.
[1] For Perceived Source Accessibility, all standardized partial regression coefficients are nonsignificant, except for the source Business/professionals, significant at $p \leq .05$.
[2] For Perceived Source Quality, *all* standardized partial regression coefficients are significant, at $p \leq .01$ or better, except for the source Competitors, significant at $p \leq .05$.
[3] For Perceived Environmental Uncertainty, all standardized partial regression coefficients are significant, at $p \leq .05$ or better, except for the sources Government publications, Broadcast media, Industry & trade associations, Company library, and Electronic information, which are not statistically significant.

R^2 value indicates the proportion of the variance in source use that is explained jointly by perceived environmental uncertainty, perceived source accessibility, and perceived source quality. For electronic information services, these three variables account for 48 percent of

the source use variance. Government officials and publications, conferences/trips, superiors, subordinate managers, internal memos, and the company library account for approximately 30 percent of the source use variance. For the other sources, the regression models account for less than 25 percent of the source use variance. These values of R^2 suggest that environmental uncertainty and source characteristics can account for a significant proportion of the total variance in source use frequency.

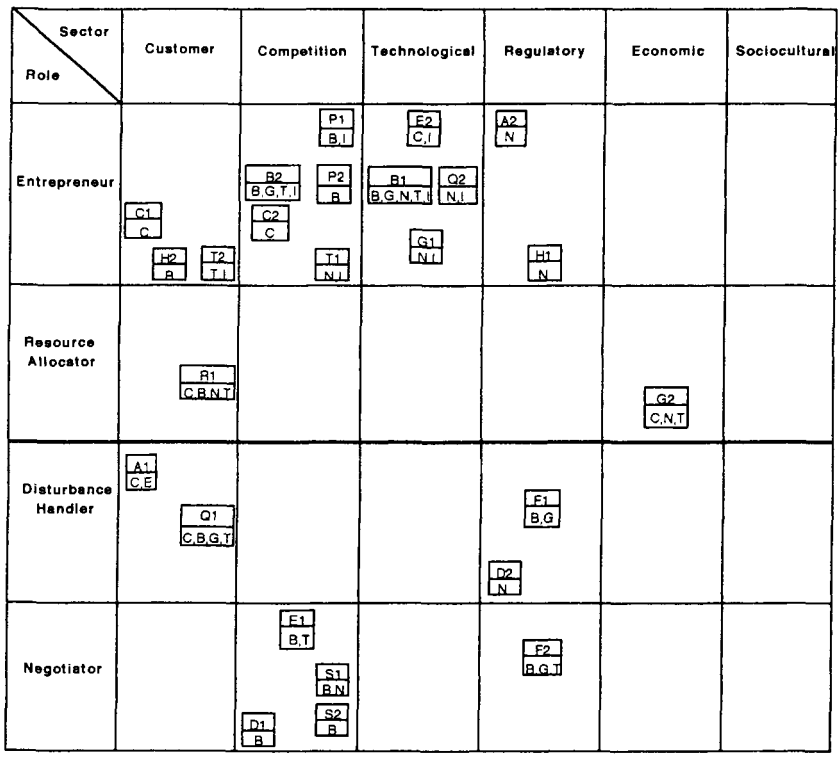
The squared semipartial correlations (sR^2) of the independent variables are computed to compare the unique contributions of each independent variable in explaining the total source use variance. sR^2 is the proportion of the total variance accounted for by the independent variable beyond that accounted for by the other independent variables (Cohen & Cohen, 1983, p. 101). For most of the sources, a very large part of the explanatory power of the regression model is due to perceived source quality and perceived environmental uncertainty—the adjusted R^2 value is due largely to the squared semipartial correlations (sR^2) of the perceived source quality and perceived strategic uncertainty variables (see Table 3). For five information sources—competitors, customers, business associates, newspapers and periodicals, and internal reports/studies—perceived environmental uncertainty accounted for a substantial part of the total source use variance. However, for every source except competitors, the greatest part of the variance is accounted for by perceived source quality.

Information Use in Decision Making

The thirteen respondents related a total of twenty-five critical incidents of using environmental information to make significant decisions for the firm. These incidents are plotted in Figure 3 which shows the decisional role the respondent was acting in, the environmental sector concerned, and the information sources used (for a detailed discussion of the interview findings, including examples of the use of environmental information, see Auster and Choo, 1994). Of the twenty-five critical incidents, fourteen are associated with the entrepreneur decisional role. This number is much larger than the number of incidents reported in the other decisional roles (five in the negotiator role, four in the disturbance handler role, and two in the resource allocator role). It would appear that respondents use environmental information mainly in the entrepreneur decisional role—they were deciding about "improvement projects" such as introducing new products and formulating business strategies (Mintzberg, 1973, pp. 78-81, 92-93). Twenty-four of the twenty-five incidents were spread over four environmental sectors: competition,

customer, technological, and regulatory. No incident was recalled for the sociocultural sector, and only one touched on the economic sector. The distribution of incidents confirms the findings of the questionnaire survey that the respondents concentrate their scanning on the competition, customer, technological, and regulatory sectors.

Because the majority of incidents concerned decision making in the entrepreneur role, we provide an example of such an incident related by one of the respondents. George (fictitious name) is CEO of a firm that designs and manufactures multiplexing and switching equipment for common carriers, interexchange carriers, and data distributors. The firm reports annual sales of $29 million and employs sixty people. The incident that George described concerned his plan to improve his firm's organizational effectiveness. Over a period of eight months, George had been looking for the best method to do this. It was during this time that he came across information about process management (PM), and he became so interested in PM that he attended a seminar in Phoenix, Arizona, to better understand its content. After the seminar, George collected data on productivity in his firm and focused his attention on possible process improvements. He then developed a short presentation on PM which was made to his management staff in Canada and to the U.S. corporate headquarters. Following that presentation, George launched a training program on PM and targeted two internal processes for review. George and his management team are now working through these two processes. George remembered that he first read about PM in an article in *Fortune* magazine. He had also been tracking journals like *Harvard Business Review*, *BusinessWeek*, and *Newsweek*. George observed that, because of depressed economic conditions, there was a growing number of articles on organizational improvement using concepts like high-performance team building, empowerment, total quality management, and so on. George's interest in PM was reinforced by another article on the topic that appeared in a more recent issue of *Fortune*. He explained that his "reason for choosing PM is that we are a very action-oriented company and we want quick returns on the things we undertake." Information about the seminar on PM came from the vice president of human resources in corporate headquarters. For his subsequent presentation to management, George used excerpts from the seminar, bought a book on the subject, and also used articles from periodicals that he had collected over the past eight months. In this incident, George was acting in the entrepreneur role, introducing an organizational improvement project based on a relatively new technique.



Each box represents one critical incident: the upper part of the box is the incident identifier (A1=First incident related by executive A); the lower part lists the sources used

B=Business associates, C=Customers, E=Electronic information; G=Government sources, N= Newspapers, penodicals, reports, I=Internal staff; T=Trade associations

Figure 3. Critical incidents of information use in decision making

Discussion

Perception and Scanning of Environmental Sectors

Respondents indicated that, as a group, they perceive the customer sector to have the highest perceived strategic uncertainty, followed by the technological and competition sectors. The importance of the customer and competition sectors is in line with past research—many studies have found that business executives were most concerned with the market and competitor sectors of the environment (Choo & Auster, 1993). The perceived importance of the technological sector is probably due to the recognition that technology is developing at a rapid pace and in ways that can radically alter how businesses operate in the publishing and telecommunications

industries. One interview respondent, who heads Canada's largest private paging firm, describes the paging market thus:

> The evolution of paging is driven by technology: capacity is expanding, size is getting smaller, and cost is falling. . . . There are certain types of decisions in which I would use environmental information more frequently. When it comes to a decision involving new technology, I would scan the horizon much more closely. I would want to answer the question: Has this technology been used anywhere else in any shape or form, not necessarily in the way that we are thinking of? We would tend to look externally much more frequently on a technical issue.

Analysis of the questionnaire data shows that there is a positive correlation between respondents' perceived strategic uncertainty of each sector and the amount of scanning of that sector. For a sector that is perceived to be strategic, the executive feels a need to be well-informed about trends and developments in that sector which may affect the firm in some fundamental way. Furthermore, for a sector perceived to be changing rapidly and in which many different factors have to be taken into account, the executive feels a need for more information in order to keep up to date with the latest developments and to understand cause and effect chains linking the factors. In sum, our analysis suggests that it is the combined effect of an environmental sector's strategic importance, variability, and complexity that influences the amount of scanning of that sector.

Daft, Sormunen, and Parks (1988) and Boyd (1989) found a positive association between perceived strategic uncertainty and frequency of scanning. The former study obtained a mean correlation of .58 for a sample of fifty chief executives of manufacturing firms in Texas, while the latter obtained .53 for his sample of seventy-two top- and mid-level executives in nine different industries. The present study shows a mean correlation coefficient of .44 between perceived strategic uncertainty and amount of scanning for our sample of Canadian CEOs. While the two earlier studies employed frequency of scanning as the dependent variable, this study measures amount of scanning by using the frequency and interest measures developed by Hambrick (1979) and validated by Farh, Hoffman, and Hegarty (1984).

Scanning Model

Applying our conceptual model, we found that environmental uncertainty (operationalized as perceived environmental uncertainty) and source characteristics (operationalized as perceived source accessibility and quality) were able to account for a significant proportion of the total variance of source use frequency. The impact of perceived environmental uncertainty was most marked for the use frequency of five sources, namely, competitors, customers, business associates,

newspapers and periodicals, and internal reports and studies. Excepting internal reports, these are all outside sources which are close to events and developments in the external environment. We may reasonably expect executives to use these sources more frequently when they perceive environmental uncertainty to be high. As for internal reports, we suggest that when external uncertainty is high, these reports and studies are useful because they summarize information and draw inferences that help executives to clarify issues and make decisions. In other words, these reports help to absorb external uncertainty (March & Simon, 1958).

The contribution of perceived source accessibility in explaining source use variance was in most cases very small and not statistically significant. On the other hand, the impact of perceived source quality is much greater and accounts for the largest part of the source use variance. This dominant importance of source quality appears to contradict well-known studies of engineers and scientists as information users which concluded that source accessibility was a more important factor in source use than source quality (Allen, 1977; Gerstberger & Allen, 1968; Rosenberg, 1967). The contradiction may be explained by considering the special nature of environmental scanning as an information-seeking activity.

When scanning, the executive would have to attend selectively to numerous signals created by an increasingly complex and dynamic environment, interpret often confusing messages, and make sense of cues in relation to the firm's goals and activities. Weick (1979, p. 130) suggests that a central information task of managers is to interpret equivocal information about the external environment. Eventually, information from scanning is used by management to chart the company's future course of action (Aguilar, 1967, p. 1), and to make decisions that could have long-term consequential implications for the firm. Taylor (1986, p. 57) also observes that when managers seek information to make unstructured decisions about unpredictable situations, the factor of "physical accessibility" may be less important than other traits (e.g., noise reduction, data quality). Since strategic planning in response to external change would often have to deal with new unpredictable situations, we may expect that accessibility is not a major concern in these conditions. In summary, we suggest that the turbulence of the external environment, the strategic use of information acquired by scanning, and the special demands of information needed to deal with unstructured situations, all combine to help explain why source quality may be more important than source accessibility when managers scan the environment.

Information Use in Decision Making

In the twenty-five critical incidents of information use related by the executives, fourteen, or more than half, involved the executive acting in the entrepreneur decisional role. As noted earlier, this number is much larger than the number of incidents related in the other decisional roles (five or fewer incidents were related in the other roles). The interview data thus suggest that executives use environmental information from scanning mainly to make "entrepreneurial" decisions about "improvement projects" such as introducing new products and formulating market strategies (Mintzberg, 1973, pp. 78-81, 92-93). Seven of the thirteen interview respondents indicated environmental information was used in ways that were strategic to the firm. This link between scanning activity and the entrepreneur decisional role is predicted by Mintzberg (1973). In the entrepreneur role, the manager initiates improvement projects to exploit opportunities or to solve problems. According to Mintzberg (1973): "Entrepreneurial work begins with scanning activity" (p. 78) where the executive uses information from scanning the environment to identify opportunities or problems, and then design and select improvement projects. The chief executive who scans a greater amount would therefore have more information about developments in the external environment, including information about opportunities or problems as well as possible solutions or alternatives. As a result, the executive who scans more would have more environmental information to call upon and to use when deciding about improvement projects in the entrepreneur role. The interview data are consistent with this interpretation. Two executives said that they regularly scan the environment for new business opportunities—one scans for new ideas about how technology is being applied in other countries while the other reads accounts of how new products have been developed successfully elsewhere. Both executives were scanning for innovations and improvements that they could introduce into their own companies.

Conclusion

The purpose of the present study has been to investigate how CEOs in the Canadian publishing and telecommunications industries acquire and use information about the external business environment. The study examined the relationship between environmental uncertainty and the amount of scanning, compared the effect of environmental uncertainty and source characteristics on source use, and explored how executives use environmental information in decision making. Our findings suggest that CEOs who experience greater environmental uncertainty tend to do a greater amount of

scanning. CEOs use a broad range of sources when scanning. The perceived quality of a source and the perceived uncertainty of the environment account for a significant proportion of the total variance of source use in scanning. Finally, the CEOs in the study use environmental information mainly to make "entrepreneurial" decisions concerning organizational improvements and business strategies.

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Developing Information Systems for Competitive Intelligence Support

BONNIE HOHHOF

ABSTRACT

COMPETITIVE INFORMATION SYSTEMS (CIS) are multifaceted services that contribute to organizational decision making by providing information services in the traditional sense, but also, and more particularly, by collecting and analyzing data from primary sources. The continuous systematic CIS provides "intelligence information," exists within an organization's other information systems, and must be supported by all levels of an organization.

INTRODUCTION

Librarians and information scientists have long enjoyed gatekeeper status in their organizations, providing service as intermediaries between information and the people who need it. Changing information sources, technologies, management practices, and organizational cultures are transforming the role of intermediary to one of enabler, providing the mechanisms to supply quicker and more direct access to information. The development of competitive intelligence (CI) activities in companies has hastened this trend. This article discusses the issues connected with developing information systems for competitive intelligence support. It provides an overview of CI system elements, defines the elements of an effective competitive information system, and summarizes major issues affecting system design and implementation.

Bonnie Hohhof, Intelligent Information, 517 Linden, Glen Ellyn, IL 60137
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Competitive Intelligence Systems

A competitive intelligence or business intelligence (BI) system is the organizational process for systematically collecting, processing, analyzing, and distributing to decision makers information about an organization's external environment. Such a systematic process organizes the flow of critical information and focuses it on operational and strategic issues and decisions. A system may be formalized in a central department or operated through an informal decentralized association. The terms CI and BI are often used interchangeably. Technically, CI is a subset of BI, focusing on the activities of competitors, markets, and industries. BI, the larger term, covers activities that include the tracking of political, economic, and social forces that affect an organization's ability to effectively compete. Optimally, the system should support BI but most often is limited to competitively defined areas. In this article we will focus on CI.

A CI system may track:

- competitor capabilities, plans, and intentions;
- markets and customers;
- industry structures and trends;
- political, economic, and social forces; or
- technological developments and sources.

The essence of a CI system lies in its function of contributing to better and more timely organizational decision making. Its primary objectives are to help decision makers avoid surprises from the competitive environment and to identify current and potential threats and opportunities. An effective system provides competitive advantage by reducing reaction time to competitive actions and improving both strategic and tactical planning.

CI systems are built on three separate, yet interdependent, activities: (1) general information services, (2) primary information collection, and (3) analysis. Each activity requires different resources and sets of skills and is often performed by separate individuals. These individuals may work directly for the CI organization or be drawn into projects as needed.

The three activities may be viewed as integrated parts of the CI pyramid (see Figure 1). The broadest and most basic activity, information services, identifies, retrieves, and distributes published or secondary information. Published or secondary information sources include commercially published reports, journals, newsletters, studies, and other items—material available through online services such as DIALOG, Dow Jones, and NEXIS. Effective CI information services also track fugitive material from consultants, trade organizations, technical societies, universities, and other sources, for which

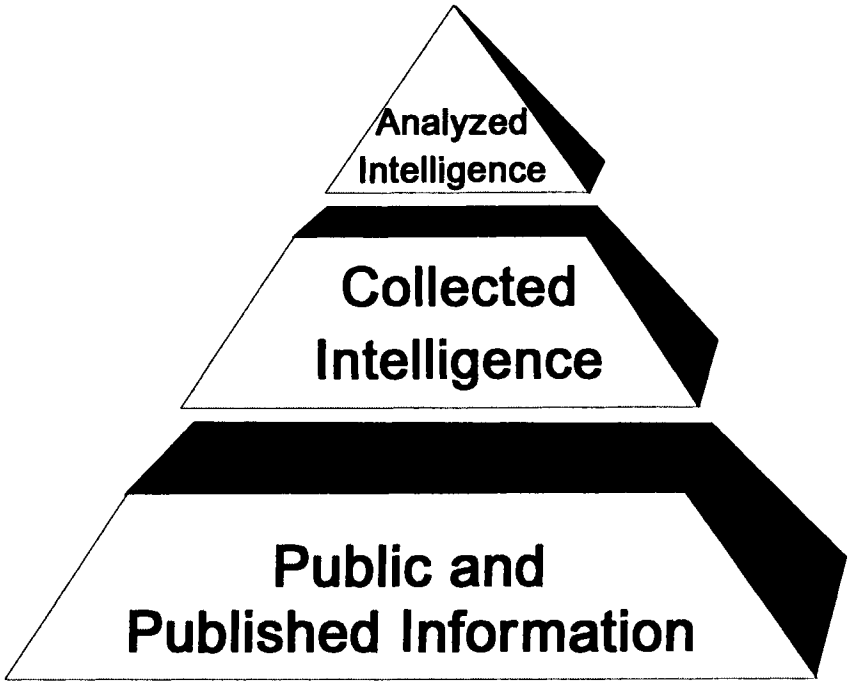

Figure 1. The CI Pyramid

bibliographic access is difficult. This category of material is often the most specialized and valuable source of competitive information and is sometimes available by simple request. This kind of service is often provided by an individual with a library background who is on the CI staff or in the organization's library.

The collection activity involves obtaining information from primary sources, usually individuals. These individuals may be employees of an organization or specialists in other companies, consulting groups, universities, or government agencies. Competent information collection of this kind requires an extensive knowledge of interviewing techniques and the ability to develop and maintain a personal information network. Effective collectors often have journalism or investigative government backgrounds. The activity of collecting information in this way is also called "human intelligence" or "humint." It is extensively used in government and security agency operations.

Analysis is the most specialized competitive intelligence activity. It integrates information supplied by the information services and collection activities with an analyst's expert knowledge. Information

is analyzed in a specific environment of problems, transformed into "intelligence," and delivered to decision makers. Analysts, who frequently possess advanced subject degrees, have extensive knowledge of industries and technologies.

Intelligence Information

Intelligence information is data about an organization's external environment compiled through a continuous systematic collection process. This information is obtained from both internal and external information sources and analyzed in concert with an organization's internal data. Intelligence information provides as complete and as accurate an understanding of the external environment as possible and helps minimize the uncertainty associated with managerial decisions.

In most situations, both primary and secondary information must be analyzed, which is often a team effort, before it becomes intelligence. However, there are situations in which the very acts of identifying and transmitting a piece of information can transform it into intelligence—without additional analysis (Chitwood, 1994). In order to be considered intelligence, it must be relevant to the decision at hand and must support an action or decision. Unfocused or "nice-to-know" information is not appropriate in CI activities. Intelligence information may identify:

- new information about customers or suppliers;
- research and development activities in the industry;
- changes in competitors' products, staffing, strategy, or finances;
- mergers, acquisitions, and alliances that rapidly change the industry; or
- structural changes in the market or in national political and economic systems.

To provide maximum benefit to a decision-maker, intelligence information must be relevant, delivered quickly, and presented in a way that facilitates rapid comprehension. Intelligence is actionable information. Major problems arise when managers receive information that:

- arrives too late to be factored into a decision;
- is irrelevant to the critical issues;
- obscures trends, ratios, and other relationships; or
- arrives without commentary, context, or explanations.

Competitive Information Systems

Competitive information systems (CIS) help managers to stay abreast of market, competitive, and world events. Often information

technology (IT) is used to help organizations keep ahead of their competition. However, CIS does not simply deliver large amounts of information; it provides information for informed decisions. The key to a successful implementation is facilitating the *systematic collecting* of intelligence information. This function is often translated into *computerizing* the process. The two processes are often and incorrectly used synonymously. Creating and using an automated tool for its own sake, without considering the required applications of an entire system, is not the same as establishing a systematic program of intelligence information collecting.

Understanding the Existing Information Flow

A good competitive information system works with an organization's other existing information systems wherever they may be: the executive suite, the marketing department, or sales offices. Because many of these systems were designed largely to produce paper reports and to support a different set of managerial decision needs, they can be awkward to work with. It is important to spend time early in the CIS design process to learn about these systems and to complement their activities. An organization's structure can often make identifying these systems difficult, particularly across divisions or geographic lines. However, because a CIS requires access to all available information, it is essential to understand where this business-critical information exists, where it travels, and, most importantly, who creates, controls, and uses it.

Before starting the competitive information systems design, many organizations first complete an information audit. Stanat (1993) suggests specific procedures for such a process, which can identify locations of information creation and modification and paths of information transferral throughout an organization (pp. 79-89). An audit provides a "roadmap" of the information infrastructure and a summary of the uses of the information.

Defining Customers' Key Information Requirements

Because management decisions involve problems that may be complex, unstructured, and may be affected by unpredictable human elements, it is impossible to anticipate all information needs. For this reason, most competitive information systems include highly personalized search and browsing capabilities which draw upon a wide variety of information sources. These systems typically allow users to filter desired information through sets of key criteria based on users' individualized and ever-changing requirements.

Most target CIS customers consider themselves to be effective decision-makers using their own systems of information gathering and analysis. Many resist devoting their limited time and resources

to learning a new system even though they may recognize the advantages of a CIS. To overcome this obstacle, the system must provide some immediate and obvious advantages. Customers will not be motivated to use a system that offers only incremental advantages.

Success Factors

Organizations can be extremely complicated, and their environments are even more complex. From organizational culture and management level support to choices of competitive information systems software and long-term maintenance, several major factors have been shown to influence the design and ultimate success of CIS (Hohhof, 1994).

The most important factor affecting the design and operation of competitive information systems is the culture of the organization. To be successful, a system must support operational and cultural changes in progress, but it cannot force them. Many CIS failures can be traced back to cultural incompatibility and organizational conflicts. An organization's culture affects not only how a CIS is used but also the ways in which information is contributed to it. For example, a culture that allows managers to hoard information cannot support CIS. This situation must be changed before a system of intelligence information sharing can be successfully deployed.

If individuals do not make maximum use of information already available on paper, they will not take advantage of information on a computer. If anything, changing the delivery vehicle actually decreases initial use of information because users must learn new procedures. Because of the need to match the existing culture, there currently is no one right system for all competitive intelligence situations. Some existing off-the-shelf systems are easily modified and can be customized to match the organization's unique requirements.

A major determinant of success in competitive information systems development lies in the attitude, efforts, and skills of those managing the system. CIS project managers bridge the worlds of competitive analysis, information processing, computers, and senior management. They must understand their organization's key success factors, possess sound communication skills, and understand information and system design. While many innovative and comprehensive systems are not developed by information technology specialists, there are certain skills and attitudes that are shared by all successful CIS managers:

- competence in competitive analysis, information processing, and senior management;

- committment to a project's mission; and
- ability to determine what is important, why it is important, and to whom it is important.

High level support, while necessary, does not guarantee success. A competitive information system must have a project sponsor at the senior management level, often a vice-president or CEO. He or she provides the system with the high visibility and patronage necessary to develop and maintain the focus and drive of a program. This sponsor also supplies the support and resources to successfully integrate the CIS into an organization's decision-making process. However, in many situations, high-level support that guarantees system success is taken for granted. Although no CIS will prosper without this kind of support, it cannot substitute for deficiencies in planning, implementation, and end-user acceptance.

High-level support must also come from an organization's information services (IS) group or department. An IS sponsor can make the entire automation process significantly simpler and more effective by utilizing the staff's knowledge of existing communication systems and hardware configurations. Organizations are political systems made of individual constituencies with specific requirements, beliefs, and objectives. To be effective, a CIS project must gain the endorsement and support of these various groups. Effective project management ensures that the system meets the actual needs of the organization and its people.

Successful competitive intelligence systems do not require more information, but rather useful detailed information that supports decision making. A successful CIS provides unique information and clearly identifies what it does and does not do. Because information from external commercial print sources can easily be accessed, many systems acquire information from such sources and redistribute it in electronic form, sometimes resulting in an electronic equivalent of junk mail. Additionally, tracking the printed press and newswires will at best keep the organization even with its competitors since every company has equal access to these information sources.

Traditional print and electronic sources support, but do not satisfy, all competitive information needs. Much information about cutting-edge technologies or future technologies, for example, is simply not published. Engineers, scientists, and developers who lead in their fields often do not have the time nor motivation to publish. Not surprisingly, many individuals and companies do not want to write about their progress because this could provide competitors insight into their business strategies.

Basic system assumptions and design decisions should coincide with the target audience's goals. The phrase, "the system passed all acceptance tests, but they (the users) will not use it" often rings true when, after initial consultation and interviews with system customers, project teams create their own assumptions about users' reactions to system designs and capabilities. Even more egregious assumptions occur when project teams assume that the users' goals and requirements coincide with their own views and experiences.

Competitive information systems software is rarely the root cause of system failure. Most failures are caused by inadequately translating an organization's information requirements into an appropriate system. In practice, while software usually functions as specified and rarely is at fault, it usually receives the blame for CIS failure. During system design, the project team can easily become enamored with the software, because a major emphasis at that point is on the use of technology to create a system. However, developers must resist the temptation to add functions simply because the software can support it. The final system should not primarily showcase software capability, but instead meet specific use requirements.

Computer-based systems need to be introduced clearly and carefully to minimize the target customers' resistance to new or different technology. Although the competitive information system is designed to help managers make better decisions, it competes with other demands of time and resources. Many target customers will find it difficult to set aside appropriate time for learning a new system. Increasingly, managers have been forced to learn several new computer systems (such as e-mail, groupware, and Windows) and are suffering from the computer equivalent of jet lag. The CIS must demonstrate to its potential users a substantial and short-term return on their investments of time and effort or risk being avoided or ignored.

A system's value-added contributions must be defined in terms of an organization's expectations requirements. The success of any new system depends heavily on how well the system developers understand their key constituents and how well these users take advantage of intelligence information. Time should be spent identifying the system's primary and secondary customers—who may or may not be the end-users of the information or intelligence provided through the system—and ensuring that their individual needs are met. This is not an easy task. Competitive information system users often have few concrete ideas about what they want the system to do ("I'll know it when I see it"). Even when individuals or organizations provide detailed design criteria, these criteria are valid only for the point in time when they are made. The composition

of the user group will also evolve, so design assumptions must be reevaluated continuously.

System maintenance and information-gathering costs must be confronted at the outset. The ultimate value of a competitive information system should be measured against the total system cost. Plans should include reasonable estimates of all the system's development, maintenance, and information-gathering costs. Unexpected system maintenance costs will appear and increase after the CIS is released, expanded, and enhanced. Under the pressure of meeting schedules and performance milestones, emphasis is often placed on the creation of a system rather than on designing a maintainable one. Although maintenance costs over a system's life are often overlooked, they can far exceed the costs of the original design. Because of resulting unplanned maintenance burdens, a CIS may be discarded before the end of its useful life.

By ignoring the maxim, "imperfection is okay; waiting too long is not," too much time may be spent trying to design a flawless system. An implicit assumption is that a system, once built, will not be altered. As a result, much energy is spent identifying all possible customer needs and evaluating all options. Not only does this consume time, but it can dull a project team's enthusiasm and cause individuals or an organization to lose interest. A CIS does not have to be perfect. If fundamental requirements have been analyzed, focus groups listened to, and environmental restrictions identified, the system will meet its key objectives. Two ways to approach an imperfect situation pragmatically is to: (1) rank the CIS goals based on the affected users and their relative importance to the business, and (2) plan a schedule that quickly delivers the crucial functions and gradually phases in the remainders.

Technical Developments

The rising sophistication of computer software and the falling cost of computer hardware have fueled the introduction of automated information retrieval systems into many management processes, including competitive intelligence. The development and implementation of decision support systems (DSS) and executive information systems (EIS) have also accelerated the acceptance of competitive information systems. Pressures to develop such systems have grown during the last decades. Prior to the early 1980s, mainframe computers dominated all corporate computing. Within organizations, all data were collected, analyzed, and distributed on mainframe systems managed by management information (or information technology or information services) departments. These departments became the gatekeepers of information and determined:

- how information would be collected;
- what information would be collected;
- how the information would appear when presented;
- where it would be distributed; and
- who would have access to it.

A major benefit of this kind of structure was that all data contained within the organization were maintained in a central location. Everyone worked from the same files, which were gathered and organized under uniform processes and procedures. If individuals had access to the central mainframes, they had access to all available computerized information in the organization.

In the early 1980s, personal computers (PCs) began appearing in organizations. Electronic information gathering, analyzing, and distributing became decentralized, and PCs assumed increasingly important roles for storage and manipulation. More sophisticated and powerful PCs eroded mainframes' advantages of internal memory capacity, speed, larger storage, and software availability.

Within only a few years (by the late 1980s), the personal computer made further advances through networking and communications tools, primarily local area networks (LANs), modems, and client-server architecture. Management information systems (MIS) groups began linking individual PCs to each other and connecting them to corporate mainframes. This permitted analysts to use their computers as they wanted, and facilitated the systematic (and centralized) collection of data throughout organizations.

Client server architecture, which can assure both independence and interdependence, is the current solution to fragmentation and decentralization of corporate data. Client-server architecture is a design in which a client (the system's user) accesses a server (or a centralized computer). This architecture interconnects computer hardware to share data throughout an organization, using LANs or wide area networks (WANs), in which two or more LANs are connected. Many organizations are implementing these networks to "reconnect" users throughout their organizations to corporate-wide computer systems. In client-server architecture, the hardware development has outpaced the software. Now that the industry has answered the question, What can be done? they are wrestling with, How do we do it? As a result, the industry is placing increased emphasis on developing groupware. Groupware is software whose central purpose is to inform or coordinate people. Group scheduling programs and workflow automation programs are groupware, because

their principal purpose is to coordinate people or work processes involving people. E-mail, conferencing, and shared-knowledge systems may be considered to be groupware because their core function is to inform people.

Current System Software

The pressure is on information systems managers and software developers to supply applications that support critical business functions including competitive intelligence, which at first seem to defy automation. Gains in computerized information services automation augment the basic processes of handling information, filtering it, and distributing it through some intelligence function.

The original text-handling systems developed from government-funded research in the late 1970s. They placed text in unstructured records and retrieved information by matching words and phrases by means of Boolean operators. Large text files could be searched quickly through inverted word indexes. Few major advances have been made in this area since. Many of the current software programs used to support competitive analysis promote their own particular capabilities by developing their own specific terms and definitions. In many cases a software company will place its own "proprietary spin" on an existing industry term to enhance the product's sales appeal and to promote it as something new.

Several information retrieval advances have found applications in competitive intelligence systems. Retrieval speed has been increased, and searching has been linked to customized thesauri or topic trees. Several systems have provided features that allow searchers to "relevance rank" search output by the frequency of search terms in a given text or to assign "weight" to certain search terms according to their relative importance. "Fuzzy" or fault-tolerant searching, an outgrowth of optical character recognition functions, allows words to be accurately retrieved even when misspelled. Natural language processing principles are also being supported by software systems. These provide:

- morphological analysis, the ability to match terms such as "mouse" and "mice";
- syntactic analysis, giving insight into the relationship between words;
- semantic analysis, resolving the different meanings of a single word such as "plant"; and
- natural (user) language interfaces.

The Next Technology

The next technology shift may also be generated from government-funded research. This development may be driven by

the increased pressure on government agencies to provide information to U.S. companies, allowing them to become more competitive internationally. As a reaction to this information demand, some government research has turned to developing more sophisticated retrieval systems as alternatives to providing more information directly.

One such new technology is context vectors. Context vectors represent words or documents as numbers, specifically vectors. Vectors for words with similar meanings will point in the same direction. The system is able to learn relationships among words in a training text and exploit such relationships for better precision and recall in text processing. The retrieval process identifies documents with context vectors close to the query context vector.

Text extraction (or message understanding) systems represent another rising technology for competitive intelligence systems. They have developed from finite state automated research and analyze the content of a document, extract lists of data, and place them into structured databases. Such an approach is effective for text-scanning tasks in which only a fraction of the text is relevant. There is a predetermined, relatively simple, rigid target representation into which the information is mapped; subtle nuances of meaning and the writer's goals are of no interest. A sample application would be the tracking of joint ventures in which a manager would want to keep current with a minimum investment of time.

Developing Competitive Intelligence Cybrarians

The characteristics of information professionals are changing quickly in competitive information systems environments. The increasing availability of information sources, the wide presence of information technologies throughout organizations, and unrelenting needs for current and changing information at the highest organizational levels (including the needs of competitive intelligence activities) are hastening the evolution of librarians into "cybrarians" (Bauwens, 1993). These new information professionals are librarians who need not rely on physical locations for information resources (or for themselves) in order to provide actionable information. They cultivate close relationships with their clients via electronic networks and provide information through a variety of electronic delivery media to users in a just-in-time fashion.

Electronic delivery media extend beyond the established external information databases; crucial to their success are systems of access to internal information and to internally developed information systems. In support of the demands of organizations' competitive

intelligence activities, and as CI practitioners become more sophisticated information users, the trend toward cybrarianship will accelerate.

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Competitive Intelligence and Social Advantage

ELISABETH DAVENPORT AND BLAISE CRONIN

ABSTRACT

THIS ARTICLE PRESENTS A BRIEF CONSPECTUS of current issues in civilian competitive intelligence (CI). The authors note an extension of the concept beyond the traditional focus on business competition and highlight emergent tools and techniques (networking and groupware) which allow the concept to be more generally operationalized in terms of social advantage. They conclude with some reflections on the possible role of library and information science (LIS) programs in providing key CI skills and competencies such as searching, summarizing, analysis, synthesis, and interpretation.

ACADEMIC ADVANTAGE

The writing of this article is a competitive act. It involves the giving, receiving, and interpreting of signals, and the understanding of the rules which determine interaction in a given social environment. The authors, who are practicing academics, wish to send certain signals, both institutional and personal. First, that their institution is active in the CI field (image management, in other words). Second, that they, as individuals, seek association with this field (what might be termed product positioning). In addition, they have linked their work by means of references to others in the field, and they seek to claim priority in the presentation of certain ideas and in the innovative linking of certain literature sets. As academics, both authors wish to add another unit of publication in a recognized

Elisabeth Davenport , School of Library and Information Science, Indiana University, Bloomington, IN 47405
Blaise Cronin, School of Library and Information Science, Indiana University, Bloomington, IN 47405
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journal to their résumés, as this may be used along with other activity indicators as a measure of individual faculty performance. A reader who wishes to analyze the competitive position and strategies of LIS schools in the United States might infer from this publication that the authors' school is staking a claim in the area of CI.

Such signals only have meaning in context. As specialists in a given social environment, both authors must identify and conform to the internal (social norms) and external (environmental constraints) rules which ensure the viability of their social group (see, for example, Becher, 1989). Work must not be plagiarized—e.g., sources and assistance must be acknowledged, copyright and patent legislation must be complied with, and the work should have no implications in terms of product liability. The authors maintain that such understanding of the internal and external environment—Bourdieu's (1991, p. 12) *habitus*—which emerges from competitive intelligence activities is the key to sustaining social advantage or ensuring viability in any context.

Identifying and operating by the rules is not sufficient, however. Players in a given sector must also be able to interpret the moves of others and the ways in which coplayers are likely to interpret a given situation or milieu. A paper submitted for publication to a journal, for example, has to compete for space; an experienced author will sometimes check the characteristics which determine the quality of a given journal, monitor the composition of the editorial board, and engineer a submission to fit (see, for example, Myers, 1990). Insider knowledge of the editorial calendar may ensure that one submission is more timely than another and so on. A similar knowledge of the rules, and how those rules are interpreted, will determine success or failure in many areas of academic life, such as applications for posts, grant/funding proposals, and the preparation and submission of both curriculum documentation and course syllabi.

Educational Edge

The sustaining of competitive advantage in academic and research environments goes well beyond the personal and institutional. Cawkell (1991) has described how the ISI's (Institute for Scientific Information) *Science Citation Index* can be used for competitive intelligence: This process opens up a means of gathering intelligence for such purposes as estimating the impact of work done by an individual or an organization or noting the growth, diminution, or change in the activities of a science-based company, educational or research establishment, or even an entire country (p. 29). Such tools have been used for more than a decade in the United Kingdom for

research evaluation purposes, though the most recent initiative (the Technology Foresight Programme) will use a Delphi technique, copied from Japan, to identify an array of technologies which promise the United Kingdom the most social and economic benefit (Bown, 1993). Output in the form of publication is one of many factors in determining the competitiveness of a given institution. Input, in terms of infrastructural investment, for example, is also important. Campus-wide information systems are recognized as an important element in attracting high calibre students, faculty, donors, and investors (Arms, 1988; Cronin, 1989).

Investment in infrastructure is obviously important at the national level. Many of the public statements which support federal investment in the national research and education network (NREN) have stressed its significance to the future industrial competitiveness of the United States. By allowing universal access to key resources, the proposed initiative should have, in theory, a leveraging effect on the general level of education, a variable identified by Porter (1990) as a strategic factor in national competitiveness. Already the Internet offers scope for accelerating technology transfer by bringing researchers and industrialists into closer contact and showcasing prototypes to potentially interested audiences.

The Traditional Approach

The elements of intelligence work are summarized neatly by Kipling (1912): I keep six honest serving-men/ (They taught me all I knew)/ Their names are What and Why and When/ And How and Where and Who (p. 83). The historic approach to competitive intelligence has focused on sources of information, which allow five of the six men to be identified—the "why," however, relies on analysis of patterns and interpretations of sources. Fuld, writing in 1985, makes similar points, but also emphasizes the importance of "Uncle Sams Library," or public domain information (e.g., federal and state registers, pp. 85-135). A decade later, the L-word is frequently invoked to describe the Internet (the world's largest public library [Tetzeli, 1994]; the postal service, telephone system and research library of the electronic age [Lewis, 1993, F7]), an interesting legitimation which may help to boost librarians' self-esteem (Chitwood, 1992). The role of the Internet in accessing federal material has been endorsed in recent legislation—the Government Printing Office Electronic Access Enhancement Act of 1993, for instance. Although the word *library* does justice to the scale of holdings and the diversity of content available on the Internet, it does not capture the analytic and interpretative aspects of CI. The idea of a national intelligence system is not new, however. Learned (1924) conceptualized the public library

as a community intelligence service, though technology has only recently evolved which allows the idea to be operationalized.

The early proponents of competitive intelligence activity place it firmly in the strategic planning level of the company (see, for example, Synnott, 1987). A highly developed version of this is offered by Beer (1986) who posits a phrontisterion, or strategic war room, with wall-to-wall monitors which constantly display the current state of an enterprise and allow anomalies to be identified and rapidly worked on (p. 194). Beer's description of the technology for this think-tank is prescient (he first introduced the concept in the early 1980s), and any version of the war-room today would probably be enhanced by an electronic meeting system (Polley & Stone, 1993). Linking competitive intelligence to a strategic apex is only one of several possible approaches. Porter (1985) has identified the need for monitoring and analysis at any level of a company, and studies of work practices in Japanese companies support this view (Lagerstam, 1990; Nakagawa, 1993). Peters (1992) argues that the success of German Mittelstand (small and medium-sized) enterprises, the backbone of the German economy, is due to a similar process of observation, interaction, and information exchange at all levels.

Covert and Overt Competitive Intelligence

The history of commercial intelligence is covered in Dedijer's (1983) early work (see also, Rayward, 1992) with the unrefined list (e.g. inventories, shipping movements, prices, and so on) a primary presentation medium. Lists can tell the enquirer who is involved in a particular area, what they did, where they were operating, and when they were active. How and why an organization has acted in the way it did can only be inferred: the analysis has to move beyond the raw list to look at context, organizational climate and culture, and patterns of previous behavior. *The Competitive Intelligence Review,* the journal of the Society for Competitive Intelligence Professionals (SCIP), provides frequent case studies from a range of industrial and service sectors (see, for example, Kight, 1992).

Such overt commercial intelligence has always had covert activity as its concomitant; the tension between making something public in the interests of the community (if you publicize the times of shipping, you attract clients who wish to ship) and concealing it in the interests of personal advantage (then a rival company could pre-empt you) is endemic in attempts to achieve social advantage. The academic sector which the authors invoked earlier as an example of a competitive social environment offers a further example in this

context—nondisclosure of work funded by a commercial sponsor—an increasing trend (Etzkowitz, 1989) which some think may contribute ultimately to the erosion of the academic journal (Davenport, 1993).

Patents offer the most invoked example of the covert/overt tension—public yet protected. Again, it is the analysis of patents that provides their main interest as a source of intelligence, as the strategic intentions of an individual research group, company, or national jurisdiction can be assessed from the interpretation of targeted subject areas and filing patterns over time (Campbell, 1983; Coy et al., 1993). There is, of course, a paradox. If everybody is potentially familiar with the great majority of sources of competitive intelligence, what is competitive about those sources? Subsequent analysis can differentiate source materials which are commonly available, as does an analyst's evaluation of their scope and inherent reliability.

Data Diversity

Much of the above material can be handled by those trained in traditional LIS skills—searching and retrieving, "parking and marking." Traditional skills may be insufficient to handle a more diverse intelligence mix. As early as the mid-1960s, the literature reveals the importance of diversity in sourcing and of multiple perspectives. Aguilar (1967) classified environmental scanning for managers into four modes: undirected viewing or constant monitoring, conditioned viewing, informal search, and formal search (p. 19). A brief overview of the topic has been offered recently by Choo and Auster (1993) while Porter's (1980) seminal text on competitive strategy advocates the exploitation of a heterogeneous set of source materials (from Securities and Exchange Commission [SEC] filings to industry gossip).

There exists a mass of less structured information. Soft sources like phone calls, ephemera, conversations, and e-mail, which are not typically managed through formal means, can serve as important assets or even weapons as in the unethical case of blackmail. Internal information, which may be secret or proprietary, is contained within a source environment (the clan, campus, or company) but can seep out into the wider world as rumor or speculation. Street-level information of this kind is exchanged in real time, lacks structure, and tends to be disseminated by gossips and industry insiders through virtual colleges and old boy networks (Cronin & Davenport, 1990).

An integrated technology base is one of the conditions that allows individuals or groups to harvest and process intelligence. A primary function is the ability to communicate and exchange information via telecommunications networks. The ability to exchange must be supplemented with the ability to trap such exchanges and to analyze what has been trapped—the significance of a message may not be

manifest until it is placed in a background of other messages. So, a further requirement of the technical base is the ability to broadcatch or gather information from multiple channels in multiple formats. As has been noted frequently, positive redundancy is a requirement of effective intelligence gathering (see, for example, Cronin, 1992).

Developments in the integration of material delivered in multiple formats can be tracked in the hypermedia/hypertext and CSCW (computer-supported collaborative work) literature (Davenport & Baird, 1992; Sproull & Keisler, 1991). Of particular interest is the work of Hillis (1985), whose connectionist technology is used by the data vendor Dow Jones to allow clients to analyze as well as source material (Day et al., 1993). Gelernter (1991) envisages parallel teams of agents whose processing capability can be compared to the neural networks that drive human intelligence (see also, Kupfer, 1994).

Technology aside, there is a range of techniques for analyzing and interpreting interaction. Sociometric techniques (Grosser, 1991) expose underlying communication patterns and can be used, for instance, to assess the frequency and intensity of interaction between identified individuals or groups, and ethnographic techniques may uncover motives, values, beliefs, and sense-making (Geertz, 1973; Guba & Lincoln, 1989). A recent review is offered by Gilbert (1993). Software for capturing and analyzing such observations ("rich pictures" and "thick descriptions") has been reviewed by Fielding and Lee (1991). Recent developments at Xerox PARC (ubiquitous computing) will allow close tracking of personnel movements and face-to-face interactions which can be archived to provide an intimate record of the work of consenting individuals and groups (*Financial Times,* 1994). The technology involved includes active badges (worn on the lapel), video cameras, and live boards (Weiser, 1991).

Demotic Data

Judicious interpretation of social cues and clues determines success or social advantage in any sphere of endeavor, from buying a used car to international trade negotiation. As Kent (1949) says in his classic text on strategic intelligence: "Intelligence is a simple and self-evident thing.... In a small way it is what we do every day...when almost anyone decides upon a course of action—he usually does some preliminary intelligence work. Sometimes the work is so informal and instinctive that he does not recognize it as intelligence—like finding the right garage man in the classified section of a telephone book" (p. vii). Rheingold (1993) gives examples of grassroots groupminds, or self-help groups, who work across a range of electronic

communities, like health care or job searching. Other electronic fora for the exchange of street information are freenets and civic networks (Fidelman & Civille, 1994).

A concrete illustration is provided by Rogers et al.'s. (1992) case study of a homeless community in California, where access to an appropriate network has promoted self-help and empowerment. A broader vision of public intelligence is offered by Steele (1993), a former deputy director of the U.S. Marine Corps Intelligence Center, who describes the intelligence community as a "vital part of a larger national information continuum that runs from U.S. elementary and high schools and the universities, through private and public libraries, business and media centers, 'rest of government' information, and directly to the White House" (p. 183). He envisages a public intelligence agency which "could provide basic encyclopedic intelligence about all manner of topics to government action officers (most of whom are not cleared for secrets), private sector enterprises, individual citizens, and, inevitably, citizens and organizations elsewhere in the world."

Net Intelligence

Via the Internet, scientists, researchers, legislators, and the business community can access countless remote, and often unknown, experts, customers, or potential clients using a variety of strategies ranging from participation in highly focused USENET groups through subscription to relevant listservs to the development of bulletin boards for advertising products and services (Cronin et al., 1994). Trawling through such diverse sources and channels was formerly a time-consuming task for intelligence analysts. Though the Internet is still an opaque and, at times, inhospitable environment, many predict that much of the tedium of searching will be relieved by intelligent agents or automated navigation and collection mechanisms.

Early evidence (Cronin, 1993; Rosenbaum & Cronin, 1993; Cronin & Rosenbaum, 1994) suggests that there is already extensive, sophisticated, and creative use of the Internet in support of business information/intelligence gathering activities. Many organizations see the meganetwork as a complement to their existing networks (Quarterman, 1993). The Internet greatly extends access to open source information like the general press, business press, trade press, directories, and company reports to both shareholders and government. A growing number of smaller technology-oriented companies are using the Internet for consumer contacts, as a prospecting source for new clients, as a means of customer communication, indirect advertising, passive benchmarking, and market research (Cronin et al., 1994).

Informal sources may be consolidated into a corpus of more structured and reliable information. A historic precedent is the emergence of academic journals from an earlier phase of epistolary exchange. A twentieth century analogy is the emergence of an electronic journal from a bulletin board or list (Harnad, 1991)—e.g., PACS-R emerged from PACS-L (*Public Access Computer System Review* from *Public Access Computer System List*). Once consolidated as public or terrain knowledge, a source, in conjunction with others, can be the basis of projections and forecasts about future events, what may be termed "horizon information." Informal communication, whether in the domestic setting or workplace, may lack structure, but it is regulated by tacit codes and etiquettes (the norms of scientific conduct posited by Merton [1973] are an example, and the phenomenon is observable in other contexts) which bond social actors into groups, clans, clubs, and families. Often these ties are stronger and more binding than those imposed by formal contracts, a phenomenon crystallized in the concept of *confianza*. This type of information is a driving force in any organizational context, and it can be trapped and exploited (Davenport & Cronin, 1991). The plenary picture derived from total monitoring of all available sources of information about an organization is bound to differ from, or may even conflict with, the summary representation which is used in public presentation (official communiqués, annual reports, news releases, statutory filings), and this dissonance provides scope for interpretation and analysis.

Cooperative Intelligence

New forms of organization are emerging which add a novel dimension to corporate intelligence work, from an almost exclusive focus on monitoring the competition to identifying and investigating potential partners (the "who" question) inside and outside the enterprise (Peters, 1992). A network organization, for example, may be characterized by high levels of procedural integration and shared objectives but also by managerial and spatial dispersion. Adhocracy is another emergent form, in which strategy, structure, and culture are determined by the requirements of a given project. And there are other commonly invoked structures like the shamrock organization, the cluster form, the inverted form, and the virtual corporation (Davenport et al., 1994). All of these forms resemble, to some extent, Burns and Stalker's (1961) model of organic management that is characterized by flexible tasks; a network structure of control, authority, and communication; ad hoc allocation of knowledge, control, and authority; and an emphasis on peer collaboration (pp. 121-22).

Such nontraditional organizational forms (NOFs) can also be found at the micro-level—groups, for example, that reside inside traditional organizations (task forces, work teams, committees, skunk works, and so on). Another "micro" instantiation of the NOF is the independent business unit or spin-off which sometimes appears to be the only way of generating a breakthrough product within hierarchical and turf-conscious firms. A common requirement for NOFs is that coworker alignment be accomplished relatively quickly, because the organization of work depends on temporary project groups. To deliver a product, people need to understand each other, come to terms in defining what they are after, and perform tasks collectively. These steps are paralleled in group processes, such as communication, decision-making, leadership, and norming. Each of these processes will go through phases determined by group dynamics. For example, people operate with different gestalts (perceptions, mind-sets) that influence their ability to construct and interpret meanings, or, in other words, to communicate. Similarly, differences in personalities may juxtapose dominant and nondominant participants, which in turn can influence group decision-making. All of the foregoing indicates that rapid access to knowledge of local habits, heuristics, expertise, and even effects will be critical success factors in the cooperative environment (Davenport & Cronin, 1990; Grumball, 1994).

In some cases, a new kind of intelligence may be required—not simply what is done but how things are done. There are several tools which can facilitate understanding—electronic meeting systems may enhance mutual understanding of human agents (Jessup & Valacich, 1993) and may allow nonhuman agents to cooperate across boundaries, or a hypertext platform may be the basis of training-by-example (Gregory, 1991). Software to integrate, manage, and share distributed information resources is widely available to support work at the desktop level. Groupware permits collaborative analysis where the need for intelligence is dispersed across multiple sites and time zones. Commonly available products include *Windows for Workgroups* and *Lotus Notes*. A recent initiative sponsored by the Department of Trade and Industry in the United Kingdom is harnessing virtual reality systems to improve cooperative intelligence in BICC, a global cable manufacturer. This virtual reality system will allow BICC to mix the cultures of its different factories and "exploit all its strengths at every location" (Moran, 1994, p. 5).

Analysis for Action

The authors have suggested that sources without analysis do not constitute high grade competitive intelligence, which is the product of value-adding processes (see, for example, Taylor, 1986). Recent

literature (see, for example, Fuld, 1992) stresses analytic procedures and techniques such as benchmarking, which involves introspection as well as examination of external competitors (see, for example, Bruder, 1992; Bookhart, 1993), sustainable growth rate analysis (see, for example, Harkleroad, 1993), and financial analysis (see, for example, Jacobi, 1992). A recent development in financial analysis is OLAP (Online Analytical Processing) which allows a multidimensional approach to data management (*Financial Times*, 1994). Outside the arena of corporate performance, techniques are available from the fields of semiotics and ethnography for analyzing corporate discourse and social interaction (Huff's 1990 compendium, for example, offers a rich variety of techniques for mapping strategic mindsets).

In certain cases, self-analysis may be as important as analysis of external players. In developing countries, for example, indigenous capabilities are a primary condition for the stimulation of social and economic growth (Cronin & Davenport, 1993, p. 14). Onyango (1991), presenting a detailed case study of Kenyan planned investment, identifies the following constructs as important: indigenous technological capability, indigenous technology learning capacity, independent world technology reconnaissance capacity, indigenous technology creating capacity, and aid negotiating capability. A new paradigm in development economics is based on self-reliance and self-renewal, which would seem to necessitate a development-oriented intelligence policy (Jequier & Dedijer, 1987; Henderson, 1973). Ventura (1987) provides a compelling case study from the Jamaican bauxite industry, which demonstrates the advantages of indigenous negotiating expertise in securing favorable terms in joint ventures with foreign direct investors.

Competitive Intelligence Librarians

The covert/overt paradox which the authors raised earlier in this article is also a problem for would-be educators because, in many cases, intelligence must be exclusive to be useful—that is, it must be contained internally within an organization or work group. There are two ways in which intelligence can be exclusive: (1) because a particular source is known only to a few; or (2) because the analytic skills of those who process the raw intelligence furnish a particular perspective or interpretation. Of course, an understanding of sources, access to sources, and analytic skills can all be taught. So, to some extent, can intelligent behavior be taught by means of simulation, client-based field work, and internships.

How might such skill sets be best built into established educational programs and curricula, and where should the focus lie? Plausible options are business (especially market research and marketing),

cultural anthropology, social psychology, international relations, and library and information science. Each can stake a claim and bring a different dimension to the analysis and practice of intelligence management. Prescott (1991) believes that schools of library and information science are candidates for curricular innovation in CI, which would be a natural extension of existing core skills. Jones (1992), in contrast, suggests that the methods of the historian are close to those of intelligence officers, and the methods of operations research (OR) can help with assessing the effectiveness of systems. He also believes that monitoring developments in information technology is important and that business studies, politics, international relations, and geography can prove useful.

Conclusion

As competitive intelligence draws on different subject areas and specialist skills, it is likely to fit best in academic disciplines that are natural boundary spanners—e.g., communication studies or information studies. A suitable faculty mix for an LIS school with an interest in CI might include systems experts, semioticians, marketing specialists, cognitive scientists, and reference experts. The institutional context where such skills are applied may well lie outside the traditional framework of the business or corporate library. The electronic playing field may demand a new kind of gamesmanship—often free agents or contract workers with little or no emotional equity in buildings, collections, or formal professional structures (Bauwens, 1993) who are adept at navigating the net and skilled at electronic eavesdropping. In any event, graduates from a curriculum which embraces CI as a core competence will be well prepared to function as information adjutants in an era of post-professionalism (Cronin & Davenport, 1988).

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Educational Programs for Intelligence Professionals

JERRY P. MILLER

ABSTRACT

PROFESSIONS AND THEIR FORMAL educational programs result from the interaction of social, cultural, and institutional factors. The current interplay of economic, technological, social, and cultural factors may support the establishment of formal educational programs for competitive intelligence professionals. However, due to the hybrid nature of the intelligence profession, the established disciplines may not provide the most appropriate environment in which these programs can flourish. To appreciate its distinctive characteristics, a definition of the intelligence function, as well as a description of the required competencies, is presented.

INTRODUCTION

The demand for intelligence professionals is rising as for-profit and not-for-profit firms recognize the need to formalize their intelligence activities (Prior, 1993). This increased awareness stems from the competitive pressures of the global marketplace as well as the favorable impacts of intelligence activities upon corporate revenues (Kelly, 1993). However, American colleges and universities place a low priority on educating competitor intelligence professionals. A small private college school offers a four-year program for the training of intelligence analysts, and a few colleges provide a single course in intelligence (Wreden, 1994). Regrettably, although the government supports two intelligence programs, only federal employees are permitted to enroll (Herring & DeGenaro, 1994). In

Jerry P. Miller, Graduate School of Library and Information Science, Simmons College, 300 The Fenway, Boston, MA 02115-5898
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addition, various professional associations occasionally offer seminars and workshops. If an apparent need for trained intelligence workers exists, why do American universities virtually ignore this profession?

The answers to this question are complex and varied. This discussion addresses the possible causes for this dilemma. To frame these comments, the definition of the intelligence process as well as a description of the required competencies needs to be clarified.

The Intelligence Function Defined

The intelligence function comprises the collection, analysis, and dissemination of information to decision makers and/or strategists about events in a company's external environment (Aguilar, 1967; Porter, 1980). Each organization implements the function differently, with specific components being assigned to individual members of a large intelligence team or with the entire function either being outsourced to a research firm or to a single individual. In some settings, specific components are inappropriate. The reasons for this variance are addressed later in this discussion.

Where the organization positions the function within the decision-making process often determines its focus and, therefore, its nomenclature. Strategic intelligence emphasizes its relationship to strategy formulation. Business intelligence stresses the detection of a wide range of movements throughout the company's external environment as well as the dissemination of the identified opportunities or threats to decision makers (Stanat, 1990; Hohhof, 1993). Competitive intelligence focuses on the present and potential strengths, weaknesses, and activities of the firms within a specific industry whose products or services closely resemble those of the company initiating the search (Porter, 1980). Competitor intelligence emphasizes the acquisition of detailed and current information regarding a specific corporation (Fuld, 1985). Although each term shifts the focus, the typical process contains the central components of collection, analysis, and dissemination of information to decision makers.

Another reason for this terminological jockeying has its basis in history. The military initiated intelligence activity for procuring highly sensitive information to conduct war effectively. Probably some military intelligence was espionage—that is, the process of using illegal and unethical means (e.g., stealing) to obtain information. Therefore, many Americans often confuse intelligence with espionage (Martin & Stedman, 1991). Consequently, not wanting to tarnish the corporate image in the minds of its stakeholders and investors, executives refer to this function discretely. Using the phrase "business intelligence" sounds less invasive than strategic or competitive

intelligence. Undoubtedly, many intelligence professionals glean considerable insights through ethical means. However, recent surveys of business practitioners revealed that a substantial number would manipulate competitor employees or misrepresent themselves to competitors' vendors, suppliers, or distributors (Schultz et al., 1994). Not surprisingly, executives have recently expressed concern over the growing frequency of unethical procedures in companies' conduct of competitive analysis (Zahra, 1994). Furthermore, the press frequently exposes those American firms that conduct industrial and corporate espionage. Consequently, such corrupt practices reinforce rather than dissolve the misinterpretation of intelligence as espionage.

The similarities between the intelligence function and market research also contribute to this terminological blur. Traditionally, market researchers determine the potential or present market for a specific product or service offering. Intelligence professionals also examine economic and/or technological trends for potential impacts on current product lines as well as for significant opportunities or threats to the strategic focus on the entire firm (Smith et al., 1992). Due to this subtle, yet important, distinction, many business executives dismiss the intelligence function as a mere trend, while other administrators, who suspect that intelligence work can provide a competitive advantage for a firm, assign the function to their market research department. However, due to its customary research focus, the staff may overlook trends occurring within those sectors of the business environment that are unrelated to product and/or service issues.

In summary, these terminological differences relating to the intelligence profession promote a misunderstanding which, in turn, undermines its adoption and growth. Later in this discussion, various steps will be suggested to alleviate these misconceptions. Before describing the components of the intelligence function, the concept of the external environment must be clarified to fully appreciate the breadth of this activity.

A company's external environment can be defined as the relevant physical and social factors outside the boundary of an organization that are taken into consideration during organizational decision making (Duncan, 1972). Also, the external environment can be conceptualized as consisting of two layers (Bourgeois, 1980; Dill, 1958). The layer closest to the organization is the task environment whose sectors of competitors, suppliers, and customers have direct transactions with the organization. The outer layer is the general environment that includes the governmental, economic, and sociotechnical sectors with which the organization may have a comparatively indirect relationship. Assigning these specific sectors to either the task or general environment depends upon how executives choose to define

and interact with the entire environment. For example, for an electrical engineering firm, the task environment may consist of the customers, suppliers, competitors, and technology sectors. For a cardboard-box manufacturer, its task environment may only consist of the customers, suppliers, and competitors since the technology sector displays minimal fluctuations. Sectoring the environment enables intelligence personnel as well as decision makers to gather specific information more effectively and efficiently.

Basic Components of the Intelligence Function

The basic components of the intelligence function consist of the collection, analysis, and dissemination of information to decision makers (Prescott, 1989; McGonagle & Vella, 1990). During the collection phase, intelligence professionals acquire relevant information from primary and secondary sources as well as through direct observation (Powell, 1992). Primary sources may be industry experts (e.g., analysts, consultants), as well as customers, suppliers, and key staff members within such departments as corporate communications, investor relations, and public relations. The research techniques used for gathering these data include telephone or person-to-person interviews, surveys, and focus groups. These sources and techniques provide a proprietary information product, which corporate directors regard quite highly.

Secondary sources include a wide variety of databases and print publications, such as analysts' reports, government publications, and industry newsletters. Because intelligence professionals must rely on materials of high quality and credibility, they seek not only to confirm the accuracy of the data, but also to identify the sources which an editor has used. Professionals can then recognize possible gaps in the information and resolve discrepancies in the data. To augment the secondary sources, intelligence professionals often contact writers for additional insights which they obtained while preparing the article. However, unlike primary materials, secondary sources are non-proprietary and are available to competitors. Therefore, managers perceive secondary data as being incapable of offering strategic insights. Therefore, intelligence professionals must add value by identifying unique patterns within the data.

In addition to primary and secondary sources, intelligence professionals also acquire beneficial insights through unobtrusive observations as well as from other staff members. For example, by inspecting the number of vehicles in a corporate parking lot as well as the volume of boxes delivered to a retail outlet by a competitor, valuable indicators of the growth or decline of a competitor may surface. Also, many staff members become aware of events and actions

in the external environment which should reach decision makers. Sales representatives can provide important comments from their customers, and other staff can contribute comments from suppliers and other contacts. However, unless channeled to the appropriate decision makers, such valuable information becomes lost in the rumor mill. Therefore, intelligence professionals can collaborate with members of the systems department to develop and install a computer-based intelligence system for capturing and communicating this information on a consistent basis with minimal effort (Hohhof, 1993). This system complements the previously mentioned methods of collecting information.

Having gathered the necessary information, intelligence professionals must then determine the trends, issues, opportunities, threats, and strategic forces emerging in the data. The analysis phase often requires practitioners to approach the data from a frame of reference similar to hypothesis testing. Having created a tentative proposition, professionals evaluate the data to determine the validity of their assumptions as well as the probability of the forthcoming and/or current impacts. Most often, these research questions focus upon specific developments within industries—e.g., new product trends within either the mainframe sector of the computer industry or the frozen soup sector of the prepared foods industry. The analysis may involve the use of statistical programs and various modeling techniques. Furthermore, the practitioner may realize the need to acquire additional data; therefore, collection and analysis are not necessarily sequential stages. Although persistence and creativity are necessary throughout this phase, professionals must also recognize the point at which further analysis would prove futile.

Professionals do not create reports within a vacuum. Therefore, for the analyses to be useful, it is necessary to understand the political and power structures that characterize decision-making processes. For example, some organizations tolerate creative and challenging analyses that question the established posture and attitude as well as offer alternatives, while others only permit analyses to confirm decisions that have already been made. What information and data-gathering techniques can be used, as well as how the data can be interpreted, are determined through an understanding of the function of analyses within the decision-making process (Bate, 1984; White, 1986; Lenz & Engledow, 1986). Regrettably, few American firms support the critical analysis and evaluation of their corporate strategy and marketing position (Martin & Stedman, 1991). Therefore, the potential for generating creative and challenging records is greater within independent research firms than within many American corporations.

The final phase of the intelligence function consists of effectively communicating the analysis. Understanding how decision makers want the information to be presented furthers the credibility as well as the use of the report. Decision makers may prefer formal research reports, brief outlines of the essential facts, or both. Regardless, executives favor charts and other visuals because they often prefer succinct graphic displays rather than extensive prose. In addition, clients may require intelligence professionals to deliver a verbal presentation of their findings, thus, providing an opportunity for further clarification of the issues. Therefore, effective communication, including written and verbal clarity as well as an extensive use of graphics, greatly determines the extent to which decision makers consider the contents of the report.

Competencies for Intelligence Professionals

Professionals must possess specific skills to effectively execute the various phases of the intelligence process. They obtain these abilities from inherent traits, coursework, professional experience, and mentors. Building upon one another, these four modes provide the array of competencies which successful practitioners need. Therefore, educators must appreciate the importance of these modes rather than adopting the simplistic concept that educational programs can serve as the exclusive means for gaining expertise. The following list of competencies was derived from personal experience, the literature (Fuld, 1985; Fuld, 1988; McGonagle & Vella, 1990), as well as from practicing professionals. Note that teaching experience or mentoring often enhances some abilities that were acquired in a preceding mode.

- *Traits:* creativity, persistence, written and oral communication skills, analytical ability, understanding of scientific methodology, independent learning skills, and business savvy;
- *Teachable Skills:* strategic thinking, business terminology, market research and presentation skills, knowledge of primary information sources and research methods, enhancement of journalistic interviewing and communication skills, analytical ability, and an appreciation of scientific methodology;
- *Professional Experience:* knowledge of corporate power structures and decision making processes, industry knowledge, enhancement of primary research skills, business savvy, and journalistic interviewing and observational skills;
- *Mentoring:* creativity, persistence, strategic thinking, and business terminology, enhancement of communication skills and research skills.

Recalling the previous discussion regarding the collection, analysis, and communication phases of the intelligence process, the need for this array of skills and abilities becomes more apparent. Having the capabilities to frame research issues, to execute the appropriate techniques, as well as to analyze the data and communicate their findings requires potential practitioners to fully develop their expertise. Professionals may attain some competencies within a different mode; that is, lacking a specific trait, an aspirant may obtain a skill within a formal educational setting. However, being deficient in any one of these competencies within the actual work environment can prove detrimental. For example, those who can conduct the research but cannot communicate effectively may not sustain a career. Apportioning the intelligence process among group members may obscure such deficiencies awhile; however, today's right-sized business executives have become less tolerant of ill-equipped professionals and prefer to retain those with a broad set of skills. Therefore, potential practitioners, employers as well as educators, must recognize how the skills drawn from inherent traits, teachable skills, experience, and mentoring converge into the composite of required competencies. Minimizing the importance of any one of these four modes can jeopardize the firm, the professional, and the educational institution. That is, the firm may not obtain the necessary skills to perform the intelligence function properly; the professional may not secure a successful career; and the educational institution may neither attract qualified students nor develop competent professionals.

To acquire these skills, some professionals may find the trait-coursework-experience-mentoring sequence inappropriate. That is, practicing intelligence workers may only need to complete a few courses that update, or expand, their skills. In others cases, those with the appropriate traits and extensive business experience may already hold an entry-level intelligence position and, therefore, may need to complete a more comprehensive set of courses. However, those candidates with a limited business background as well as with few inherent traits could find that, even after having completed a full range of courses, they are unable to secure a job in the field. In short, completing coursework is insufficient preparation for a career as an intelligence professional. Therefore, although the sequence may vary, successful candidates draw their expertise from all four modes.

Although few dispute the value of traits and mentoring as modes for imparting important skills and insights, the literature contains considerable discussion regarding the respective role that work experience and formal education plays in the development of professional competencies. Highly skilled positions in the new economy

demand the appropriate attitudes and technical skills which education and job experience provide (Richman, 1994). The relationships between experience and education are firmly established in professions such as law, medicine, teaching, the ministry, and social work, which require candidates to complete an internship component before receiving their degree. The changes brought on by the global economy are forcing other professional schools, where the experience-education partnership has not been firmly entrenched, to reshape their curriculum and to develop cooperative agreements in the workplace. For example, over the past few years, corporate America has criticized business schools for failing to prepare students to function in business. These executives demand that schools evaluate potential students by the quality of their work experience as well as their ability to manage (Blum, 1991; Stonham, 1992). Responding to the pressure, the tradition-bound Harvard business school will revamp its curriculum and incorporate more practical components throughout the program (Bongiorno, 1993).

Accounting programs have also been criticized recently for failing to teach what accounting practitioners actually do. Prodded by the American Accounting Association and the American Institute of Certified Public Accountants, schools are establishing internships and related cooperative programs which benefit both students and employers (McCombs & VanSyckle, 1994). Likewise, a growing number of engineering programs are complementing theory with hands-on experience after practitioners leveled accusations of not preparing students to meet current and future challenges. At the University of Minnesota, Stanford, and MIT, for example, students are collaborating on design projects with companies. These programs enable the students to define customer needs, to work in project teams, and to manage project time effectively (Durfee, 1994).

Finally, the Society for Technical Communication's (STC) board of directors urged academics to prepare students for the actual work that industry needs them to perform (Hayhoe et al., 1994). Because theory cannot be studied in isolation from practical applications, they recommended that students be required to participate in an internship, practicum, or co-op program which can both sharpen their focus on the functions that they will perform and teach them aspects of the profession which they cannot learn in the classroom.

Therefore, the place of work experience within the context of professional education is gaining considerable importance. Learning from these examples, similar industry-education collaboratives are appropriate modes for providing the experience-related competencies for intelligence professionals.

Factors Affecting the Development of Formal Educational Programs

To repeat the earlier mentioned definition, the intelligence function comprises the collection, analysis, and dissemination of information to decision makers and/or strategists about events in a company's external environment. To perform this function effectively, successful professionals acquire the necessary skills from inherent traits, coursework, work experience, and mentoring. Their efforts prove highly beneficial for many firms. As Kelly (1993) indicated, the average return on investment (ROI) for intelligence projects within a wide range of corporations was 310 percent. Furthermore, as American businesses increase their participation in the international marketplace, success and survival hinges on good intelligence activity (Herring, 1994). Whether a firm is protecting its corporate secrets or detecting those of competitors, intelligence work is critical, particularly for firms operating within a highly volatile industry, such as electronics (Parker, 1994; Kokubo, 1993). If intelligence activity means success and survival, and if an elaborate array of skills, including those acquired from coursework, are essential to perform this function effectively, why do American universities virtually ignore this profession?

An appropriate starting point in response to this question stems from the status of intelligence work as a profession. As Abbott (1988) indicated, professions emerge from the coalescence of contingent forces, including social and cultural recognition of the work or activity, professional associations, dominance of related disciplines, as well as the establishment of educational programs, standards, codes of ethics, and designated journals. However, these factors do not follow a clear causal pattern; rather, as Abbott's system model suggests, professions emerge from the interaction of larger forces, such as competitors and internal structures. Therefore, analyzing the evolution of some other profession may not reveal the causes for the sluggish emergence of educational programs for intelligence workers. However, appreciating the interaction of these factors can offer some beneficial insights. The following discussion examines the interplay and prominence of the contingent forces that influence the evolution of the intelligence profession and its formal educational programs.

Social change transforms professions by creating, increasing, or decreasing the need for certain professional activities (Abbott, 1988, pp. 143-76). The expansion of corporate America during this century increased the need for many specialized professionals. The need to verify charges, debts, and fees gained greater prominence, thereby prompting the rise of public accountants. The need to create desire

for products or services encouraged the growth of advertising agencies. The need to refine their production and service delivery processes stimulated the exponential growth of technology and, in turn, the engineering profession. Technological advances in mass media, accompanied by population shifts, transformed aspects of journalism and the performing arts. Among the many social changes of today, American firms are increasing their exploitation of opportunities in the global marketplace as well as their protection of corporate secrets from foreign intruders. The internationalization of the American economy heightens the importance of collaboration and cooperation on a global scale as well as diminishing the plausibility of economic isolation. Accompanying this change is the growing need for information about events in the global business environment as well as the critical analysis of how the emerging opportunities and threats could affect American firms. Despite this rising need, only 3 percent of American corporations have established competitor intelligence teams (Martin & Stedman, 1991).

Cultural change also transforms professions (Abbott, 1988, pp. 177-211). Because culture legitimizes the function and results of professional work, changes in social values reprioritize the importance and dignity given to certain activities. That is, shifts in cultural values greatly influence society's perception of, and demand for, professional work. For example, when a culture values physical and psychological well-being as well as justice, doctors, psychologists, lawyers, and their related schools, flourish or at least maintain their status. When Americans raised their esteem for efficiency and effectiveness, engineers and technologists, as well as the followers of the father of scientific management, Frederick W. Taylor, gained prominence, as did their respective schools. Even though these machines and methods relegated workers to inhuman conditions, the culture regarded the ultimate outcomes of corporate profits and global prestige, which these technological advances enabled, more valuable than their crippling effects on the work force (Hitch & Miller, 1994). Therefore, even though a professional activity includes certain undesirable functions, society tolerates the associated sacrifices and bestows dignity upon such work if it enables the attainment of a higher value. To maintain justice and national security, as well as to conduct war effectively, the government trains intelligence and security personnel at the Defense Intelligence Agency's Joint Military Intelligence College and at the Department of Defense Security Institute. Despite its covert activities, society supports government intelligence to preserve peace and order. The culture tolerates the ignoble aspects of government intelligence work because it enables the attainment of peace.

Society does not, however, endorse business intelligence, because many Americans, including those within business, only perceive its cloak-and-dagger aspects. This prevents an appreciation of the need for maintaining competitive advantage as well as for protecting technology and trade secrets. This lack of support does not infer that society does not value its technology and trade secrets; rather, society does not recognize the benefits associated with the intelligence function. In addition, society cannot admit that American and foreign businesses engage in competitive and covert activities (Deighen, 1993). Hiding behind a pretense of noble conduct is counterproductive for the economy, corporations, and investors. Experts have estimated that U.S. firms lose $20 to $30 billion per year due to foreign and domestic corporate and industrial espionage (Deighen, 1993). The most frequently confirmed reports regarding corporate spying against U.S. firms involve Argentina, France, Japan, Germany, and the United Kingdom; accusations have also been directed at an additional forty nations (Herring & DeGenaro, 1994).

Due to the social stigma associated with business intelligence, management attempts to conceal its intelligence efforts. Within the first six months of this year, the national and trade press reported on firms within the aerospace, pharmaceutical, automotive, tobacco, cable television, telephone, and personal health care products industries that conducted industrial espionage. Inevitably, additional cases were left unreported. The surprising fact is not that U.S. corporations conduct intelligence operations, but that they pretend these activities are unknown to Americans. Corporations cannot disclose the details of these operations; however, these thinly-veiled cover-up efforts are also counterproductive and mask the associated benefits. Undoubtedly, upon learning that firms conduct business intelligence, whether ethical or covert, certain investors may withdraw their support, and some customers may boycott products or services. Corporations must find ways to legitimize the value of the intelligence function within the American culture, otherwise they will continue to expend resources needlessly.

A third factor that affects the evolution of professions in general and the intelligence profession in particular is the dominance of academic disciplines over their respective knowledge bases. As Abbott (1988, pp. 196-211) indicates, universities influence the professions in various ways. They can maintain the scholarly foundations of professional expertise. They can promote the development of the knowledge base by testing hypotheses. They can train upcoming professionals. They can foster interprofessional competition by monopolizing the instruction of students in specific courses. For example, in the 1930s, a fight ensued between lawyers and accountants

in practices and on campuses as to who had the authority to teach accounting principles to law students and commercial law to business students. Within professions, needs emerge that require practitioners to acquire knowledge from related disciplines. However, such changes in the professional functions can undermine the knowledge base of various disciplines. Therefore, it is not surprising that the positioning of coursework for the intelligence profession poses a problem for universities. The varied skill set for intelligence professionals is derived from the established disciplines of journalism, communications, information science, business administration, and statistics. Which discipline is prepared to relinquish control of its knowledge base, as well as its head count, to another department or school for the training of intelligence professionals?

A fourth factor that influences the development of a profession is the establishment of associations. These professional groups serve many functions. They claim jurisdiction over specific expertise. They control the activities of practitioners by establishing professional standards, certified courses, examinations, licenses, and a code of ethics. And finally, they serve to inform practitioners by publishing journals and newsletters as well as by convening meetings and conferences. These functions were formalized with the establishment of the Society of Competitive Intelligence Professionals (SCIP) in 1986, whose membership currently includes over 2,500 practitioners and academics. The society has issued its code of ethics, has published its own journal since 1986, and has convened nine national conferences. The present officers and directors are exploring various alternatives regarding the educational components of the profession.

As with most professions, however, the formation of a professional group alone does not ensure jurisdiction over expertise. Rather, the interplay of social and cultural factors as well as the monopolization of the knowledge base by academics, together with the establishment of professional groups, promote the evolution of a profession. Therefore, examining how these factors interact offers insights regarding the lack of formal educational programs for the intelligence profession.

Society and its businesses have yet to fully embrace the internationalization of the American economy. The hope of regaining global dominance in the marketplace, which America held for many years after World War II, still permeates society (Martin & Stedman, 1991). Focusing upon tactics to regain dominance shifts the attention away from sharing and using information effectively (Maglitta, 1994). Therefore, the need to gather, analyze, and evaluate information about activities in the business environment is minimally recognized (Martin & Stedman, 1991). Reflecting this position, the curriculums of

professional schools, particularly those within the business discipline, place a low priority on the intelligence function. Certainly, their course offerings emphasize the management of information systems, but within the broader goal of training potential directors and CEOs. Consequently, the practice of accessing, analyzing, and evaluating competitive information is looked upon as a clerical function and of little concern to corporate administrators. Furthermore, mirroring the cultural disdain of the function, if the curriculum incorporates the topic of business intelligence, it is covered within a few sessions of a market research course or a continuing education workshop. Rather than jeopardize their reputation in today's unstable higher education market, prominent business schools prefer to demonstrate their sensitivity to business trends by introducing environmental management courses (Pham, 1994). Therefore, these professional programs reflect how management practitioners and the American culture regard the practice of competitive intelligence.

Despite the effect which these social and cultural factors have had upon the development of a formal educational component, academic journals within various disciplines and the popular business press contain a large body of literature devoted to many aspects of the intelligence function. Recognizing the importance and value of this function, these academics continue their attempt to establish a credible program within their respective schools. In addition, the practitioners remind strategists, market researchers, and executives within their respective firms of the benefits associated with this activity. The momentum behind these efforts, as well as the cumulative effect of the internationalization of the American economy, will spur the adoption of the following recommendations.

Recommendations

The establishment of formal educational programs does not, in itself, further the development of a profession. Rather, the contingent factors which affect the evolution of professions also influence the development of a credible educational program. When society needs and values a specific professional activity, a formal educational program interacts with these forces for support, legitimacy, and justification. If, however, a curriculum is instituted to train professionals in an activity which society marginally needs or values, that program, and its students, will founder. Therefore, those advocating these educational changes would be wise to, first, analyze their external environment—that is, determine the status of these contingent factors. Based upon this evaluation, they can raise the level of appreciation for the importance and significance of the intelligence function and the potential graduates.

Advocates can continue their expansion of the support base by demonstrating the relevance of intelligence activities to organizations regardless of their purpose. Presently, competitive intelligence is a function associated, almost exclusively, with for-profit organizations. However, profit as well as not-for-profit settings can, and do, benefit from acquiring information about their external environment. Therefore, illustrating its applicability to a wider array of organizational settings can, in turn, heighten the perceived need for this function as well as demonstrate that organizations procure such information for reasons other than increasing profits.

Advocates can further influence how managers value intelligence activities by providing them with evidence indicating the extent to which foreign competitors do not, in fact, play by the rules (Deighen, 1993; Herring & DeGenaro, 1994). Raising their awareness of these activities can motivate them to adopt proactive counterintelligence procedures which would protect valuable intellectual property. Taking a proactive stance can also elevate intelligence activities' importance and status to a valuable corporate function. In turn, these administrators can speak to their stockholders and stakeholders of the positive aspects of business intelligence to offset any initial decrease in support which may accompany the adoption of counterintelligence activities. Therefore, a proactive corporate posture regarding intelligence work can raise its importance and dignity as a legitimate function and profession.

These outreach efforts not only benefit managers and their organizations, but also the support base upon which the staff, faculty, and students must rely for funding, research and internship sites, as well as job placements. Therefore, the importance of these various benefits require proponents to collaborate with an extensive array of organizations and professional associations. In addition to the Society of Competitive Intelligence Professionals, other groups might include those from market research, strategy and policy development, communications management, journalism, as well as specific industry segments which may be most receptive to intelligence activities, such as biotechnology, financial services, and telecommunications. These contacts may prompt the emergence of opportunities for both the organization as well as for staff, faculty, and students.

Due to the widespread ignorance and dim regard for intelligence work among Americans and U.S. corporations, programs should initially be established at highly visible and credible institutions. With their distinguished faculty and exceptional professional schools, prominent schools will attract the caliber of students which this profession requires. Furthermore, their introduction of these programs will increase the perceived value of the intelligence profession,

which is a critical factor at this point in its evolution. Mounting programs at unrenowned institutions during this initial stage will be detrimental, regardless of the excellence of their curriculum. They will find it difficult to develop collaborative arrangements within prominent organizations and to attract qualified students. Ultimately, such programs could diminish the already dim view of this profession.

Recall that professionals acquire their expertise from inherent traits, coursework, professional experience, and mentors. Therefore, quality programs exhibit these various modes not only by offering a comprehensive curriculum, but also by attracting qualified students and providing enriching internship experiences. Students who can analyze problems creatively, teach themselves new skills, and communicate effectively, can capitalize upon the strengths of the curriculum. Building upon this foundation, the internship phase enhances students' skills and insights as well as providing beneficial services to clients. Because students may choose to build upon previous coursework or job experience within a specific discipline, program directors must establish collaborative relationships with mentors from organizations in various industries. In addition, assembling a wide variety of settings demonstrates the applicability across industries. Dismissing the importance of attracting qualified students, as well as not providing an internship component, threatens the marketability of the graduates and the program.

A comprehensive curriculum comprises courses of instruction including strategy development, market research, primary research methods, statistics, information sources, as well as interviewing and communication techniques. These topics draw upon the knowledge base of multiple disciplines, including information science, business administration, statistics, communication, and journalism. Therefore, the placement of a program within any one of these disciplines would alter the focus of the intelligence function and the profession. That is, depending upon its placement, the public would associate intelligence work with the traditional knowledge base of only one of the disciplines, thereby obscuring the hybrid nature of this function. Certainly, the curriculum within schools of business administration already includes many of these courses. Their directors and faculties have established many collaborative arrangements with prominent organizations and related professional groups. However, although their valuable experience and contacts would satisfy the recommended components of an intelligence program, the social stigma associated with intelligence activities prevents these schools from initiating such programs. In addition, initiating programs within business schools could imply that only profit organizations need the services of intelligence professionals, which, as previously mentioned, misrepresents

the applicability of this function. Schools within these other disciplines could recognize similarities between the content of their curriculum and aspects of the intelligence function. However, rather than acquire the necessary internal and external resources, and driven by decreasing revenues and increasing operating costs, advocates within these schools could choose to contort the desired range of competencies to conform to their current curriculum. Furthermore, they could rationalize that those components, left unsatisfied, are nonessential. Such actions would jeopardize the school, the intelligence profession, and, most importantly, the students.

A reasonable alternative is to initiate an Institute of Strategic Intelligence at prominent colleges and universities. This suggestion may circumvent many of the problems previously mentioned: (1) Using strategic intelligence in the title emphasizes its relationship to strategy formulation and decision making, which, ideally, are basic to successful organizations. The negative connotations are, therefore, minimized. (2) With sufficient outside funding, institutes can often be established rather quickly. Most importantly, though, being independent of other disciplines, the analysis, evaluation, and dissemination of information to decision makers remains the primary focus. However, although independent, the administrators would establish consortia with other departments and schools whereby graduate and undergraduate students could become proficient in the skills necessary to function as intelligence professionals in their primary discipline. (3) Independence would also permit the administrators to establish collaborative arrangements with organizations from a wide variety of industries and specialties to serve as internship sites. (4) Having established this beachhead, administrators could explore the feasibility of becoming a degree-granting institution. If this step appears surmountable, an appropriate professional association, such as the Society of Competitive Intelligence Professionals, might consider functioning as the accrediting body. Therefore, this alternative could preserve the integrity of the intelligence profession as well as ensure the suitable training of practitioners at prominent colleges and universities.

Conclusion

The internationalization of the American economy continues to cause dramatic changes throughout society. In addition, telecommunication technologies enable the swift transfer of information and shorten the decision-making processes. These economic and technological changes prompt the expansion and contraction of industries as well as the emergence and disappearance of professions.

However, the evolution of professions is not rapid but results from the interaction of social, cultural, and institutional factors. When societal needs and cultural values coalesce, an environment is spawned which supports the growth of professional educational programs. Institutions respond by offering appropriate programs that prepare qualified professionals. Might not the current economic, technological, social, and cultural changes be creating such an atmosphere for intelligence programs? If so, the distinctive nature of the intelligence profession requires its formal educational programs to be established within hybrid environments.

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The Literature of Competitive Intelligence

THOMAS D. WALKER

ABSTRACT

THE LITERATURE CONCERNED WITH competitive intelligence (CI) and related issues lies primarily outside that of library and information science. Because the relevant subjects are not always clearly defined, and because related terms are used interchangeably, bibliographic access can be difficult. The CI literature is described in terms of its location, quantity, authorship, length, and problems of bibliographic access.

INTRODUCTION

Competitive intelligence (CI) activities are information-gathering activities, yet the major portion of the CI literature resides outside the mainstream library and information science literature. Because the field is interdisciplinary, relevant works can also be found in the business and scientific literatures and, perhaps because aspects of CI activities capture the imaginations of nonspecialist readers, one can easily find coverage in newspapers and popular magazines. As implied by some of the preceding articles, the field has remained relatively informal. Practitioners have a variety of educational backgrounds and experience. It is only relatively recently that interested professionals have assembled to share their experiences and promote their activities. The Society of Competitive Intelligence Professionals (SCIP—formerly the Society of Competitor Intelligence Professionals) was founded in 1986 and currently has about 1,600 members. Of interest to CI researchers and practitioners is its quarterly journal, *The*

Thomas D. Walker, School of Library and Information Science, University of Wisconsin, P.O. Box 413, Milwaukee, WI 53201
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Competitive Intelligence Review, with a circulation of about 2,000, and a membership newsletter, *The Competitive Intelligencer.*

Bibliographic Access

Appropriate indexes include *ABI/Inform, Business Periodicals Index,* and other standard business, business news, and news indexes, as well as *ERIC, Library Literature,* and *Library and Information Science Abstracts.* A regular feature of the *Competitive Intelligence Review,* the "Competitive Intelligence Library," by Bonnie Hohhof, serves the readership as a current awareness tool. It provides bibliographic citations, brief abstracts, and book reviews. Sable (1985) compiled a large bibliography of works (articles, books, and dissertations) about industrial espionage and trade secrets. Valuable literature discussions are supplied by relevant dissertations and other large-scale research projects. Several of the books discussed later provide bibliographic access in the form of lists of recommended readings. While several of them are designated "bibliographies," perhaps the best is a "select bibliography" by Roukis, Conway, and Charnov (1990) with over 300 books—some on intelligence practices in general—and 178 articles (pp. 295-315). A useful review of the environmental scanning literature has been provided by Choo and Auster (1993).

Subject Access to Competitive Intelligence and Related Topics

The *Library of Congress Subject Headings (LCSH)* (1993) supplies a scope note for "business intelligence" (vol. 1, p. 666) which, with "issues management" (vol. 2, p. 2445) are the two relevant terms that are official headings. Linked to this term, and illustrating some of the problems with terminology, are seven "used for" terms:

- business espionage;
- corporate intelligence;
- espionage, business;
- espionage, industrial;
- industrial espionage;
- intelligence, business; and
- intelligence, corporate.

The terms, especially those referring to espionage, are not synonymous with "business intelligence." Similar problems are expressed among the broader topics:

- business ethics;
- competition, unfair; and
- industrial management.

Note that several legitimate activities are expressed by these terms, although they are not distinguished from one another. Others imply unethical or illegal information-gathering activities that have little to do with accepted practices of intelligence gathering. "Competitive intelligence" itself is not an established term in *LCSH*. For works about environmental scanning, *LCSH* refers to the term "organizational environment." For information seekers in this area, it is important to recognize the limitations of these subject headings.

A brief study of the competitive intelligence literature as reflected in *ABI/Inform,* a major business database, was carried out to answer the following questions:

- Which of the terms under consideration for this issue of *Library Trends* appear as terms in the subject fields of the database's records?
- Which of the terms appear in title or abstract fields?
- Do sets of articles retrieved by the individual terms coincide with each other, or do terms retrieve sets with little overlap which might indicate they have more distinct definitions?

The search covered the CD-ROM version of the database from January 1987 through June 1994 and considered the following terms: "business intelligence," "competitive intelligence," "competitor intelligence," "environmental scanning," and "issues management." Combinations including the term "strategic," such as "strategic intelligence," yielded articles in this and other databases, but many articles were concerned with military, rather than business, aspects of intelligence-gathering activities. Two terms appeared in the subject fields of the *ABI/Inform* records—"competitive intelligence" and "environmental scanning." The others appeared in abstract or title fields. Table 1 lists the terms and the number of articles retrieved for each for the period.

The two closest terms in meaning, "competitive intelligence" and "competitor intelligence," retrieve widely different numbers of articles, likely due to the latter's fall from usage in favor of the former. Not only did SCIP change its name, but writers in the field also shifted from one term to the other over a period of years. The number of articles retrieved by "competitor intelligence" rose from two in 1987 to eleven in 1989 and has declined to four and six articles for 1992 and 1993, respectively. For the preferred term, the number of articles has gradually increased from 1987 with eight articles, to 1993 for which fifty-three were retrieved. One retrieves very few articles using "competitor intelligence" that are not retrieved with "competitive intelligence."

There is not considerable overlap between or among the terms. Only two articles were retrieved that shared three of the five terms mentioned earlier: "business intelligence," "competitive intelligence,"

and "competitor intelligence." For articles sharing two terms, the numbers are also small as shown in Table 2.

"Issues management" shares seven articles with "environmental scanning" but no others. The highest rates of coincidence occur among the terms "business intelligence," "competitive intelligence," and "competitor intelligence." Additional comparisons of terms consisting of single words rather than the two-word expressions used here could lead to additional conclusions. For instance, it is likely that, while the use of one-word terms in combination with each other would lead to a high degree of recall, the use of two-word terms would result in higher precision. A thorough analysis of even the most important permutations would be beyond the scope of this survey.

Competitive Intelligence Research

While most of the competitive intelligence literature has been intended for the consumption of busy managers or CI professionals, there have been serious studies of these topics. Empirical research, including some dissertations, has been cited by Choo and Auster (1993)

Table 1.
Articles Retrieved from *ABI/Inform* for the Period January 1987 through June 1994 Using Selected Terms

Terms	*Articles Retrieved with Terms in Subject Field*	*Articles Retrieved*
Business intelligence	0	49
Competitive intelligence	212	255
Competitor intelligence	0	35
Environmental scanning	167	192
Issues management	0	115
Total articles retrieved:		646
Total, minus duplicates:		590

Table 2.
Articles Retrieved by Term Pairs (Based on Search in Table 1)

	Issues Management	*Environmental Scanning*	*Competitor Intelligence*	*Competitive Intelligence*
Business intelligence	0	2	3	20
Competitive intelligence	0	3	23	-
Competitor intelligence	0	0	-	-
Environmental scanning	7	-	-	-

and Miller (in his case study earlier in this issue of *Library Trends*). An example of a large-scale survey can be seen in the study of 1,483 executives by the Conference Board, Inc. (Sutton 1988). An eight-page questionnaire was designed to elicit the following kinds of information:

- importance of monitoring competitors' activities;
- importance to top management of monitoring competitors' activities;
- relative development of company monitoring system;
- effectiveness of company monitoring systems;
- trends of companies' monitoring activities;
- functional title of person responsible for monitoring competitors' activities;
- rank of person responsible for monitoring competitors' activities;
- functional title of executive to whom monitoring person reports;
- rank of executive to whom monitoring person reports;
- key to maintaining an effective monitoring system;
- types of information about competitors;
- information sources (within the company, within the trade, published information, and other);
- media in which information is made available; and
- examples of decisions relying on monitoring information

A significant portion of the report is a set of summaries of CI systems written by executives in the following corporations: AT&T; Kraft, Inc.; Motorola, Inc.; Adolph Coors Company; Pfizer, Inc.; Combustion Engineering, Inc.; and several others who expressed wishes of anonymity. The resulting report is a snapshot of CI practices for the period of the study.

The Monographic Literature

Are books the best place to find information about competitive intelligence? As is the case with many practical fields that value currency over almost everything else, information about CI and related activities is communicated through personal channels first, secondarily through articles in the periodic professional literature, and lastly through books. Books take longer to write and produce but tend to retain their value longer. For CI, they are perhaps most valuable for summarizing, synthesizing, and evaluating recent professional practices. This kind of literature attempts to be more comprehensive and is more likely than the journal literature to address ethical, legal, and philosophical issues. One of the better chapters on CI ethics is by Gilad and Gilad (1988, pp. 205-213). Bonnie Hohhof, formerly a CI practitioner at two major corporations and now a CI consultant—

and also the primary literature reviewer for the *Competitive Intelligence Review*—recommends several book-length surveys of the field: Fuld (1988), Gordon (1989), Meyer (1987), Powell (1992), Prescott (1989), Tyson (1986, 1990), among others, to which may be added her own recent work (Hohhof, 1994). In addition to these, there are many handbooks for establishing CI systems, including Sammon, Kurland, and Spitalnic (1984), and Tyson (1986).

One of the very best surveys of the field is a collection of contributions by a variety of researchers edited by Roukis, Conway, and Charnov (1990). The book is not a competitive intelligence handbook. Thoroughly documenting their chapters, the authors address theoretical and practical issues facing CI at national and international levels. It is worth noting that none of the twenty authors represents library or information science; besides management and economics, their specialties include geography, mathematics, engineering, and political science.

Stanat (1990) expresses her conception of corporate-shared information networks in the form of an eleven-step method of designing and developing such systems. The idea behind such programs is one that prevents information hoarding at departmental or individual levels and encourages the sharing of information through a centralized system—either a database or information center.

Recommended frequently in the competitive intelligence literature is a work by Gilad and Gilad (1988). Despite its age, the work is clearly organized and appropriate for managers or CI practitioners of today because it is concerned with broad conceptual issues rather than specific technical problems. It is one of the few works to address ethical issues of CI.

In his work for upper-level managers, Mathey (1991) provides a well-balanced picture of the competitive intelligence process. He clearly explains how systematic and highly specific methods of information collection can be implemented. Perhaps most useful, especially for those information professionals who are accustomed to the gathering and organizing of information but not to its analysis, is Mathey's attention to competitive analysis activities. He argues strongly that CI, with a strong analytical component, is an excellent return on investment.

Likewise providing a useful chapter on analysis, Vella and McGonagle (1988) survey such topics as (intentional) disinformation, the integration of competitive intelligence into business planning and defensive CI. Several appendixes in the book are of potential use for CI professionals or departments: "The CI Process—An Outline," "A CI Classification System" (a system of classifying the reliability of

data, not of information sources), "Competitor Analysis Outline," and "Setting Up an Internal CI Unit."

Experienced business librarians will not be enlightened by *The Competitive Intelligence Handbook* by Combs and Moorhead (1992). Several chapters introduce standard business reference sources but do not approach the breadth and depth of any of the standard guides to business information. The authors also provide information on specialized databases and a short discussion of books about CI. Perhaps the most useful chapter presents some "axioms of competitive intelligence" including the following:

- most of the information needed for a given project is available through publicly available channels;
- information is where you find it;
- single sources of information are unreliable;
- someone else cares about the subject; and
- companies, like individuals, leave a paper trail as they go about their business.

Some of these guidelines are common research strategies, others are merely inspirational; yet for novice information seekers these truisms are succinct and their explanations potentially instructive.

Espionage and Security

The competitive intelligence literature frequently emphasizes that intelligence activities are *legal* means of acquiring information about companies, their products, their personnel, and the business environment. There is a large related literature about industrial espionage (and counter-espionage), trade secrets, and security that can be fruitfully consulted by CI professionals. While such areas are beyond the scope of this issue, two examples are useful here. One is a book-length bibliography of works about industrial espionage and trade secrets from 1907 through 1984 (Sable, 1985). Besides providing a comprehensive list of works on the topic, it examines the growth of the field as reflected in the literature decade by decade. The second, a book about industrial espionage, can serve—despite its age—as an introduction to intelligence-gathering methods (Bottom & Gallati, 1984). It is intended to be a guide for security managers who want to guard against spies and saboteurs. It is not a spy manual but rather an introduction to covert information-gathering tactics and the means of preventing them. Not included, of course, are issues affected by advances in electronic storage and retrieval, communications technologies, and networks. Major topics include:

- roots of industrial espionage;

- competitive intelligence;
- likely participants in industrial espionage;
- information gathering and retention;
- ethical and legal issues;
- planning and organizing counterintelligence operations;
- investigative methods (communications, undercover assignment, placing agents, identifying enemy agents, information development, doubling espionage agents, reconnaissance and surveillance, and others);
- scientific and technical aids;
- research activity (briefing/debriefing, overt/covert sources);
- refining counterintelligence data;
- producing intelligence;
- uses of intelligence; and
- security.

Journals and Competitive Intelligence

As indicated in the introduction to this issue of *Library Trends,* dozens of journals and magazines regularly carry articles about competitive intelligence and related topics. A small amount of coverage can be found through standard indexes to the library literature in such periodicals as *Online, Special Libraries,* and a few others. Four articles form the core of a special issue of *Minnesota Libraries* (vol. 28, Winter 1987-1988). InfoTrac's *Academic Index,* which covers about 1,500 academic journals, and the *New York Times,* retrieves fewer than 100 items using the five terms as subjects or keywords for the period 1990 through June 1994. The ERIC database, for the period 1982 through June 1994, retrieves only twelve articles with the terms "business intelligence," "competitive intelligence," or "competitor intelligence," but supplies leads to 395 items for "environmental scanning" and "issues management," most concerned with educational institutions.

Most of the journal literature is to be found among business periodicals. The search of *ABI/Inform,* mentioned earlier, yielded 646 articles (590 with duplicates removed) in 171 different periodicals in the areas of management, management information systems, computers, and information science (the latter including the *Journal of the American Society for Information Science* and *Bulletin of the American Society for Information Science*). Table 3 lists the periodicals containing five or more articles retrieved using all of the five related terms mentioned earlier.

A bibliometric analysis would probably demonstrate that Bradford's law holds in an exaggerated way: given the subject of competitive intelligence over a period of about seven years, a very small

TABLE 3.
PERIODICALS WITH FIVE OR MORE CI AND RELATED ARTICLES, RETRIEVED FROM *ABI/INFORM* FOR THE PERIOD JANUARY 1987 THROUGH JUNE 1994.

	Periodical	*Number of Articles*
1.	*Long Range Planning*	24
2.	*Security Management*	20
3.	*Public Relations Journal*	19
4.	*Journal of Business Strategy*	15
5.	*Computerworld*	14
6.	*Planning Review*	12
7.	*Journal of Management*	11
8.	*Bank Marketing*	9
9.	*Journal of Business Ethics*	9
10.	*Business Marketing*	8
11.	*Database*	8
12.	*Management Accounting*	8
13.	*Public Relations Review*	8
14.	*Strategic Management Journal*	8
15.	*Across the Board*	7
16.	*Association Management*	7
17.	*Sales and Marketing Management*	7
18.	*Business Quarterly*	6
19.	*Business Horizons*	6
20.	*CA Magazine*	6
21.	*Chief Executive*	6
22.	*Forbes*	6
23.	*Information Strategy: The Executive's Journal*	6
24.	*Journal of Business and Industrial Marketing*	6
25.	*Marketing News*	6
26.	*National Underwriter*	6
27.	*Online*	6
28.	*Communication World*	5
29.	*Environment Today*	5
30.	*Marketing Intelligence and Planning*	5
31.	*Small Business Reports*	5

number of journals publish a disproportionately high percentage of the articles in the field and most publish only one (Diodato, 1994, p. 24). Table 4 lists the most frequently appearing journals for the period of January 1990 through March 1994 for each of the five terms.

Each of the articles retrieved by the term "competitor intelligence" appears in a different journal, representing a most extreme Bradford "distribution." For none of the terms can one speak of three equal Bradford zones. For some reason—perhaps because the sample is too small or because the literature is very practice oriented—the classic Bradford distribution does not apply. This literature could be described as having a very small core and very much scatter. The scatter includes dozens of periodicals as diverse as *Agri Marketing, American Salesman,*

TABLE 4.
NUMBER OF PERIODICALS WITH ARTICLES RETRIEVED FROM *ABI/INFORM* FOR EACH OF THE FIVE TERMS (FOR JANUARY 1990 THROUGH MARCH 1994)

Number of Articles per Periodical for the Period	*Number of Periodicals with Articles about Business Intelligence*	*Number of Periodicals with Articles about Competitive Intelligence*	*Number of Periodicals with Articles about Competitor Intelligence*	*Number of Periodicals with Articles about Environmental Scanning*	*Number of Periodicals with Articles about Issues Management*
1	21	61	19	53	27
2	2	15	0	6	5
3	0	11	0	0	4
4	1	3	0	1	0
5	0	1	0	1	1
6	1	0	0	0	0
7	0	1	0	1	1
8	0	0	0	0	0
9	0	1	0	0	0
10	0	0	0	0	0
11	0	0	0	0	1
12	0	0	0	0	0
13	0	0	0	0	0
14	0	1	0	0	0
Total periodicals/ Total articles:	25/34	94/177	19/19	62/80	39/71

Lodging Hospitality, and *IEEE Transactions on Engineering Management.* Samples from the cores for the four terms that retrieved multiple articles in small numbers of journals provide a summary of the most prolific journals in each area. The following journals contain four or more articles for the period January 1990 through March 1994:

Business intelligence: *Computerworld* (6 articles), and *Business Strategy* (4).

Competitive intelligence: *Security Management* (14), *Journal of Business Strategy* (9), *Computerworld* (7), *Long Range Planning* (5), *Database* (4), *Research-Technology Management* (4), and *Small Business Reports* (4).

Environmental scanning: *Long Range Planning* (7), *Environment Today* (5), and *CA Magazine* (4).

Issues management: *Public Relations Journal* (11), *Public Relations Review* (7), and *Management Accounting* (5).

Two periodicals are concerned primarily with CI but are not indexed by the *Business Periodicals Index* or *ABI/Inform:* the two SCIP publications mentioned earlier, the *Competitive Intelligence Review* (1990-) and the society's newsletter, *Competitive Intelligencer* (1986-).

Journal Authors and Competitive Intelligence

Most competitive intelligence practitioners are very active professionals with little desire or incentive to write about what they do, but it is precisely from this group that most of the journal literature originates. Among the most prolific writers are CI practitioners and consultants with ties to SCIP. The authors most likely to carry out research about CI activities, philosophies, or education, or to write long articles, are academics.

By far, most of the authors in this field write one article or a portion of an article each. A search of *ABI/Inform* for a seven and one-half year period indicates (see Table 5) that more than 90 percent of authors wrote fewer than two articles each, about 5 percent wrote two or 2.33 articles each, and very few wrote three or more articles (using an adjusted count for co-authors). That this is an exaggerated version of Lotka's law (Diodato, 1994, p. 105) may be due to the practice-oriented nature of the literature.

Table 5.
Authors with Two or More CI Articles each as Retrieved from *ABI/Inform* for the Period January 1987 through June 1994 (Co-Authors are Represented Proportionately)

Author	*Number of Articles*	*Percent of Total Articles Retrieved (646)*
Anonymous	41	6.35
Fuld, Leonard	8	1.23
Herring, Jan P.	6	0.92
Ojala, Marydee	5	0.77
Arbetter, Lisa	4	0.61
Betts, Mitch	3	0.46
Dresner, Howard	3	0.46
McGonagle, John J.	3	0.46
Tanzer, Marc	3	0.46
Gilad, Benjamin	2.33	0.36
14 authors	2	4.33
11 authors	1.5, 1.33, or 1.25	2.63
574 authors	1 or fewer	88.85

Most articles in this field are not jointly authored, as demonstrated by Table 6. It is not surprising that most articles are written by single authors, but it is striking that there exists such a considerable variation from one of the five search terms to the others.

Why is a significantly larger percentage of articles retrieved by "environmental scanning" written by two or more authors? Some of the variation may be attributable to the small sample, but there may be other explanations. Among the journals with articles about environmental scanning, there seems to be a higher percentage of

TABLE 6.
NUMBER OF CI ARTICLES, BY NUMBER OF AUTHORS PER ARTICLE RETRIEVED FROM *ABI/INFORM* FOR THE PERIOD JANUARY 1990 THROUGH MARCH 1994

Term	*1 Author/ Percent of Total Articles*	*2 Authors/ Percent of Total Articles*	*3 Authors/ Percent of Total Articles*	*4 Authors/ Percent of Total Articles*	*Total Articles*
Business Intelligence	32/94	2/6	0/0	0/0	34
Competitive Intelligence	145/81	21/12	6/3	5/3	177
Competitor Intelligence	16/84	2/11	0/0	1/5	19
Environmental Scanning	57/71	16/20	5/6	2/3	80
Issues Management	60/84	8/11	1/1	2/3	71

TABLE 7.
MEDIAN NUMBER OF PAGES FOR ARTICLES RETRIEVED FROM *ABI/INFORM* FOR THE PERIOD JANUARY 1987 THROUGH JUNE 1994

Terms	*Median Number of Pages per Article*
Business Intelligence	3
Competitive Intelligence	4
Competitor Intelligence	4
Environmental Scanning	7
Issues Management	4

academic journals, which may be more likely than practical business periodicals to contain multi-authored articles. There is a significant difference in length between articles about environmental scanning and the others. Based on a search of *ABI/Inform* for January 1990 through March 1994, it can be shown that the median number of pages per article for those retrieved by the term "environmental scanning" is much higher than for the other terms (see Table 7).

Articles about environmental scanning indeed tend to be longer than the others; 39 percent are ten or more pages in length compared with 9 percent for "business intelligence," 13 percent for "competitive/competitor intelligence," and 21 percent for "issues management." For competitive/competitor intelligence, a higher percentage of articles are one page or less (17 percent) than are ten or more pages in length (13 percent). About 42 percent of the articles retrieved with "competitive intelligence" or "competitor intelligence" are three or fewer pages.

CONCLUSION

Most of the competitive intelligence literature is created by individual CI practitioners for others in the field. For that reason,

most publishing in the area consists of very short professional articles in business periodicals rather than research. To unusually high degrees, authors are very likely to write only one article each about the subject, and journals are very likely to publish only one article each. Very few authors have written more than two articles and few journals have published more than ten CI articles. Because some terms have been used interchangeably and because the subject is interdisciplinary, there exist certain problems of bibliographic access that can be surmounted by a working knowledge of controlled vocabularies and by an awareness of the existence of multiple related expressions in postcoordinate retrieval systems.

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About the Contributors

ETHEL AUSTER is a faculty member in the Faculty of Library & Information Science, University of Toronto where she teaches courses in administration and online information retrieval. She has published in numerous journals, and her recent books include *Retrenchment in Canadian Academic Libraries* (Canadian Library Association, 1991) and *The Online Searcher* (Neal-Schuman, 1990).

CHUN WEI CHOO is a faculty member in the Faculty of Library & Information Science, University of Toronto where he teaches courses in management and information retrieval. His research interests are in the use of information in organizations and information management. Recent publications include a chapter in ARIST, and articles in JASIS, LISR, and IP&M.

BLAISE CRONIN is Professor of Information Science and Dean of the School of Library and Information Science, Indiana University at Bloomington. He was educated at Trinity College, Dublin (M.A.) and the Queens University of Belfast (Ph.D.). From 1985 to 1991 he held the Chair of Information Science at the University of Strathclyde and was also Head of the Department of Information Science. Dr. Cronin has published extensively in the areas of citation analysis, strategic information management, and information marketing. His books include *The Citation Process, Elements of Information Management* (with Elisabeth Davenport), and *The Marketing of Library and Information Services 2* (Editor). Dr. Cronin has worked as a consultant, teacher, and researcher in more than thirty countries. His work has appeared in such journals as *Journal of the American Society for Information Science, Journal of Documentation, European Journal of Marketing, Scientometrics, Libri* and *International Journal of Information Management.*

ELISABETH DAVENPORT is Visiting Professor in the School of Library and Information Science, Indiana University at Bloomington. She has M.A. and M.Litt. degrees in Greek and English Literature from the University of Edinburgh, and a Ph.D in Information Science from the University of Strathclyde. Her work has appeared in the *Journal of Documentation, Electronic and Optical Publishing Review, International Journal of Information Management, Journal of Information Science, Hypermedia,* and *Online Review.* Dr. Davenport has been an invited speaker at conferences and colloquia in Mexico, Finland, Australia, Norway,Yugoslavia, and the United Kingdom. Her current research interests lie in the areas of electronic document delivery, network economics, and groupware.

BONNIE HOHHOF (B.A., Northwestern University, M.S., Rosary College) is a charter member of the Society of Competitive Intelligence Professionals (SCIP), is Founding and Executive Editor of the *Competitive Intelligence Review,* and has authored *Competitive Information System Design* (Glastonbury, CT: The Futures Group, 1994). She was responsible for developing internal and external intelligence sources at Motorola, Inc., where she also produced baseline competitive reports, intelligence bulletins, and newsletters covering industry trends, competitors, and market changes. At Ameritech, as Project Manager for Marketing Information Systems, she managed the design, development, and operation of a computer-based competitive information system. Through her consulting firm, Intelligent Information, she provides competitive information system support to large companies.

F. W. LANCASTER is Professor Emeritus in the Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign and is Editor of *Library Trends.*

JANE LOESCHER has an M.S. in Library and Information Science from the University of Illinois, Graduate School of Library and Information Science in Urbana-Champaign. Ms. Loescher has a B.A. in biological sciences from the University of Delaware. She co-authored the article in this issue of *Library Trends* while a master's student at the University of Illinois.

JERRY P. MILLER, an assistant professor in the graduate school at Simmons College, teaches courses in competitive intelligence, the management of information technology, and ethics. He is a member of the Boston chapter of the Society of Competitive Intelligence Professionals (SCIP), on the editorial board of SCIP's *Competitive*

Intelligence Review, and will work with SCIP at the national level on developing the educational requirements for intelligence professionals. Mr. Miller has presented papers on the educational requirements for information professionals at the conferences of the Association for Computing Machinery and the Northeast Decision Sciences Institute.

THOMAS D. WALKER is Assistant Professor at the School of Library and Information Science at the University of Wisconsin—Milwaukee. He received degrees in library and information science from the University of Chicago (M.A.) and the University of Illinois at Urbana-Champaign (Ph.D.). With research interests in bibliography and library history, Mr. Walker teaches courses about reference sources and services, government information, and information science. He has published articles about library historiography, research methods, library education, and the history of scholarship and has contributed to encyclopedias of music bibliography and library history. He is currently editing Adalbert Blumenschein's "Beschreibung verschiedener Bibliotheken in Europa," an eighteenth-century manuscript account of about 2,500 European libraries.

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